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THE GENESIS OF GASTRIC ULCER*

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THE more recent views on the anatomy, physiology, and pathology of the stomach have necessarily been presented to the profession in a fragmentary way. The purpose of this paper is to bring together those views which bear particularly upon the etiology of gastric ulcer and to enquire how, in the light of this knowledge, the cure of such a lesion may best be effected. For a clear understanding, however, of the etiology of gastric ulcer, as pronounced by Aschoff and others, it is expedient first to review the more important anatomical features of the stomach, including its nervous mechanism and its blood supply, and also the functional phenomena as seen in its constantly changing conformation and its secretory activities.

The accompanying illustrations depict the three muscular layers of the stomach:

1. The external layer, made up of irregularly distributed longitudinal muscle bundles, which are continuous with the longitudinal fibres of the œsophagus, and which are most readily demonstrated, because of their preponderance, in the zone of the lesser curvature. In the illustration they are seen only in a short section at the cardia.
2. The middle or circular layer, continuous with the circular fibres of the œsophagus. These fibres are sparse at the cardia, where they straddle the lesser curvature, are at first directed downward and to the left, and show a gradual increase in thickness as the pylorie orifice is approached, eventually forming an aggregation which constitutes the sphincter.
3. The inner layer of oblique fibres, which, beginning above, astride the greater curvature, are directed downward and to the right, stopping short of the lesser curvature on each side, the distal insertion of the larger bundles occurring in the line of the so-called isthmus.

These layers are so distributed as to divide the active stomach into four functional zones,—the fornix, the corpus, the vestibule, and the pylorie canal. The oblique fibres are responsible for the demarcation of the corpus from the pylorie antrum and the functional differentiation of the corpus from the zone immediately beneath the lesser curvature,—a zone designated by Forssell[1] as "the gastric street."

The mucous membrane directly or indirectly supplies the digestive elements,—pepsin, rennet, gastrin (or gastric secretin), and hydrochloric acid, and on account of its arrangement and varying mobility is here more and there less susceptible to injury and repair.

Along the lesser curvature are found four well marked longitudinal mucosal folds, which extend through the zone of the isthmus, spreading out fan-like into the pylorie canal, whereas the convolutions of the greater curvature are very numerous, freely movable, and without definite arrangement. The demarcation between the mucous membrane of the gastric pathway and that of the corpus is provided by the oblique fibres, which, according to Bauer, act as a kind of sphincter between the corpus and the gastric street and pylorie canal. There may even be a definite colour difference between the mucosal folds of the pathway and those of the fundus. A further point of difference is that during

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contraction of the stomach the longitudinal mucosal folds of the "street" are stretched and under tension, especially in the region of the isthmus, while the mucosa of the corpus becomes redundant and convoluted.

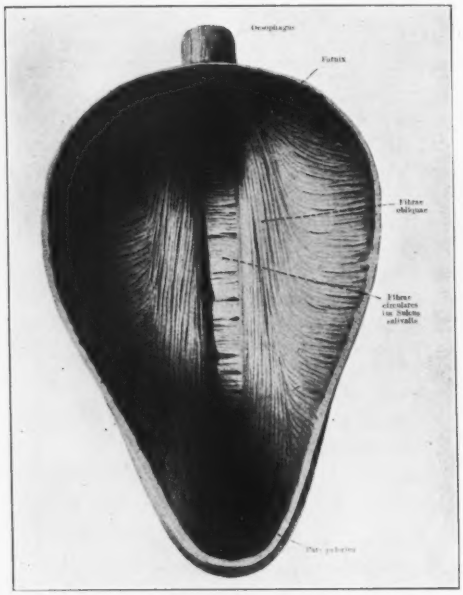

FIG. 1—Photograph of interior of stomach of infant after the removal of the mucous membrane, showing the anterior and posterior fasciculi of oblique fibres bounding the gastric pathway. (After Tandler).

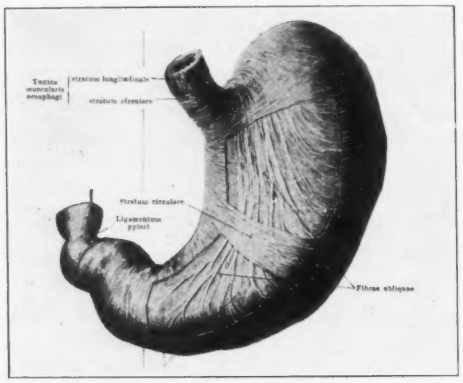

FIG. 2—Photograph showing dissection of muscular coats of stomach. (After Spaltcholz).

Aschoff's[2, 3] observations upon the form of the stomach, carried out upon human beings immediately after death, confirm and extend the work of Cunningham, Forssell, and Simmonds. Aschoff found that local stimulation produced local contractions in the stomach wall and also contractions of the whole organ, with the establishment of a distinct isthmus in the distal portion. True peristaltic movements were not observed. Stomachs in which generalized contractions occurred were fixed and later opened. The gastric pathway of Forssell was found to be more or less obvious, according to the degree of distension of the organ. The evidence seems to indicate that along the gastric pathway, in the vestibule, and in the pyloric canal, the sub-

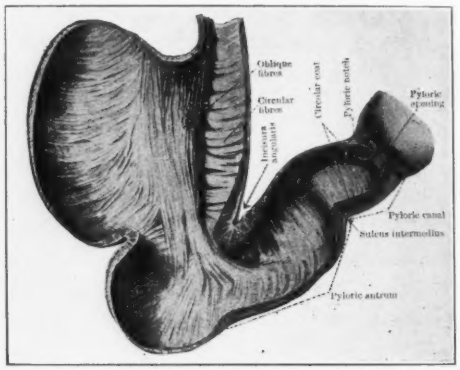

FIG. 3—Photograph showing the anterior fasciculus of the oblique muscular coat lying along the margin of the gastric street and its lower insertion in the line of the isthmus or incisura angularis. (After Cunningham).

FIG. 4—Drawing showing longitudinal arrangement of mucosal folds in the gastric street, spreading out fan-like into the pyloric antrum. (After Aschoff).

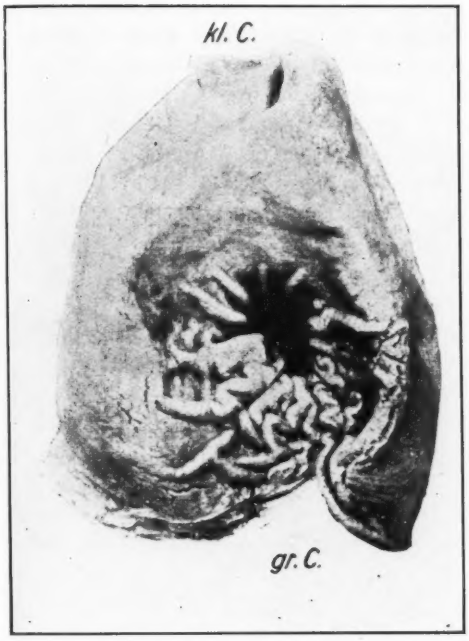

FIG. 5—Photograph of cross section through the corpus of the stomach showing the longitudinal arrangement of the mucosal folds in the roof of the gastric street and the irregular convoluted folds of the greater curvature. (After Aschoff).

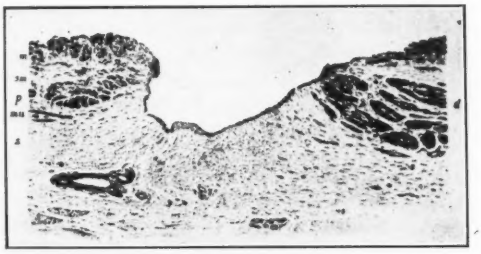

FIG. 6—Microphotograph of gastric ulcer, showing overhanging mucous membrane on cardiac side. (After Strohmeyer and Aschoff).

mucosa is firmer in texture and the muscularis mucosæ better developed than in the other parts of the stomach. Moreover, the specimens which showed a well developed isthmus ventriculi also showed a constant arrangement of the mucous folds of the gastric pathway and pyloric vestibule, the longitudinal folds of the narrow way becoming less prominent at the isthmus and spreading fan-like toward the pyloric canal.

Information regarding the distribution of the glands in the normal gastric mucosa is very incomplete. Even under normal conditions there are wide variations in the boundaries of the different kinds of glands, and there is also a considerable intermingling of the different types. The modern views are enunciated by Aschoff and his pupil Oshikawa. Oshikawa[4] studied the glands in canine and later in young human stomachs.

Aschoff and Oshikawa classify the mucosal glands as follows:—

1. Pyloric glands, lined with clear epithelium, which give a mucous reaction and which occupy the pyloric canal and that part of the lesser curvature corresponding to the radiation of the gastric pathway;
2. Intermediary glands, lined with cells which resemble but are not identical with the pyloric cells (the adjacent or intermediary cells);
3. Fundic glands, long and tubular, first described by Heidenhain, lined with darkly staining chief cells and coarsely granular parietal cells. The transition of the adjacent or intermediary glands into the fundic glands occurs very gradually.
4. Cardiac glands, lined with a special type of epithelial cell, forming a narrow circular zone about the cardiac orifice, and secreting mucus.

The point that one would stress in dealing with the arterial supply of the stomach is that it is very dissimilar in the lesser and the greater curvature. While the fundal wall is richly

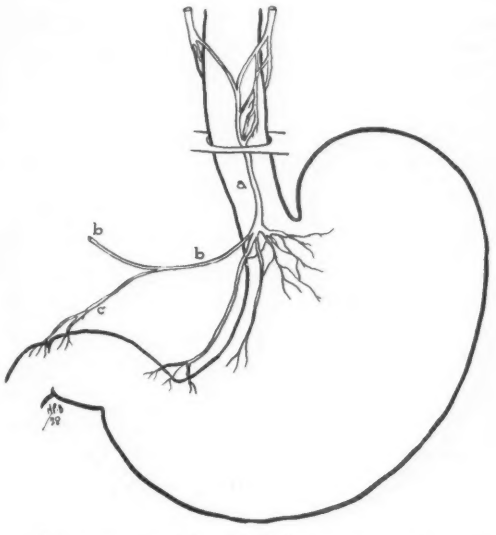

DIAGRAM 1.—(a) Anterior vagal trunk. (b) Hepatic branch. (c) Branch to pyloric portion of stomach and first part of duodenum. (After McCrae).

nourished from both sides, the lesser curvature is supplied only through recurrent branches of the coronary and pyloric arteries, the line of the isthmus being the zone of anastomosis.

The nerve supply of the stomach is shown in the illustrations, which are self-explanatory.

The former teaching that the left vagus was distributed to the anterior surface of the stomach and the right vagus to the posterior surface, is now known to be incorrect. Each supplies fibres to both surfaces. Stimulation of a single vagus in the neck will cause movements of the whole stomach. The arrangement of the œsophageal plexus is very constant, and from it arise the anterior and posterior trunks, each containing fibres from both vagi. As will be seen from the diagrams, the principal branches of both trunks lie along the lesser curvature and extend to the region of the isthmus. The pyloric vestibule, the pyloric canal, and the first portion of the duodenum receive their nerve supply from the hepatic branch of the anterior vagal trunk. The posterior vagal trunk supplies a large branch to the cœliac plexus, from which, among other abdominal organs, the pancreas, kidneys, and small bowel receive vagal fibres.

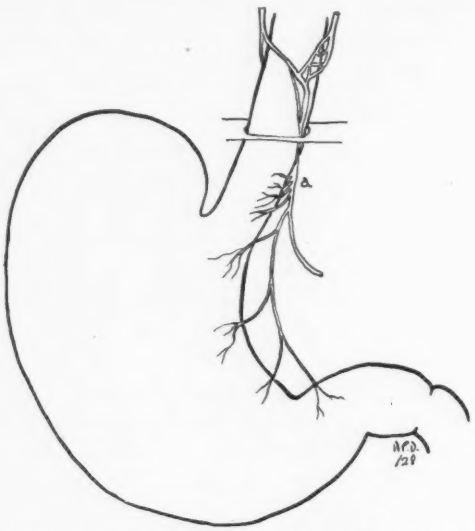

DIAGRAM 2.—Posterior vagal trunk. Note that branches do not extend beyond the isthmus. (After McCrae).

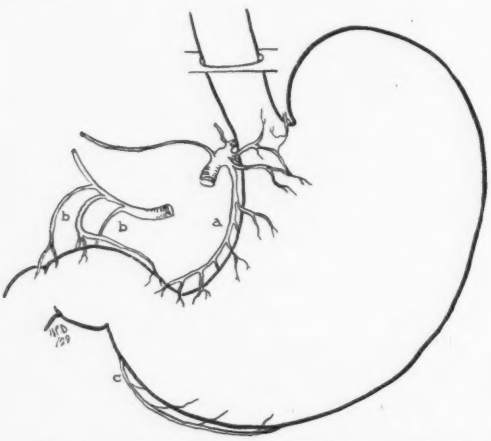

DIAGRAM 3.—Showing distribution of splanchnic nerve. (a) Branch accompanying coronary artery. (b) Pyloro-duodenal distribution. (c) Branch accompanying right gastro-epiploic artery.

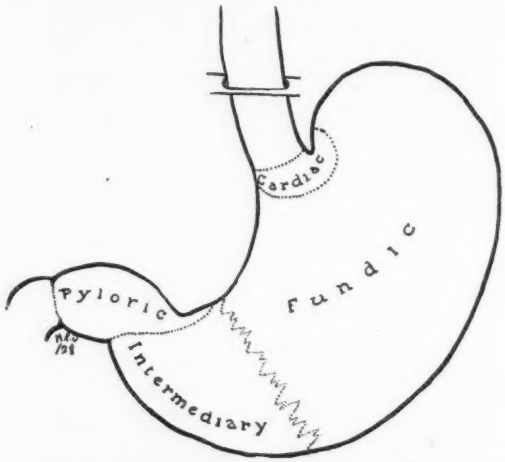

DIAGRAM 4.—Showing distribution of different types of glands in gastric mucous membrane.

The sympathetic fibres are derived from the cœliac plexus, the larger branches accompanying the coronary artery. Other branches accompany the hepatic artery and supply the pylorus and the first portion of the duodenum. Still other fibres accompany the gastro-duodenal artery and its gastro-epiploic branch.

The intrinsic nerves consist of a network of fibres lying between the muscle coats as well as vagal and sympathetic ganglion cells lying beneath the serosa or between the muscle bundles.

The vagus contains both augmentor (or accelerator) and inhibitor fibres, but mainly augmentor. The reaction to stimulation depends upon the pre-existing state of what has been termed "the peripheral mechanism of the stomach," the physiologically active stomach reacting to stimuli more vigorously than the resting stomach. In either case an augmentor response follows sooner or later. These observa-

tions have been confirmed by x-rays, which demonstrate hyperactivity and rapid emptying. McCrae's results show that both tonus and movement are regulated by the vagi. Conversely, the splanchnic nerves, though containing both augmentor and inhibitor fibres, are chiefly inhibitors.

Section of one vagus or of one splanchnic is without demonstrable effect. Complete vagal section results in dilatation of the stomach, diminution of tonus, slow and weakened peristalsis, and delayed emptying,—on the whole, retardation of function. Splanchnic section has almost exactly the reverse effect, resulting in an acceleration of function. Section of all nerves has an effect similar to, but slightly less marked than that produced by complete vagal section. Several observers state that these results are not permanent, but that, after a varying period, tonus is regained and movements are apparently normal .

The effect of nerve section on secretion and acidity is doubtful. It appears to be certain that an active juice is still secreted after denervation. The hormonic phase of secretion is, however, said to be dependent upon the integrity of the nerves of the pars pylorica. This accords with the clinical observation that pylorectomy greatly diminishes acid secretion, and supports the experimental work of Edkins of St. Bartholomew's, published in 1908, which proved conclusively that secretion of hydrochoric acid invariably follows the intravenous injection of an extract prepared from the pyloric mucous membrane, but from the pyloric mucous membrane only.

The walls of the empty stomach are usually collapsed, and are unfolded by the nervous mechanism when food enters. The unfolding is most rapid when fluids are ingested. Solids are held at the cardia and descend gradually. The food accumulates in layers as swallowed. Liquefaction takes place at the periphery of the food mass in contact with the mucous membrane, and, as digestion progresses, the fluid portion is expressed into the "gastric street" or drainage canal lying beneath the lesser curvature, and thence flows through the pyloric antrum into the pyloric canal. In the fundus tonic contractions alone occur. In the antrum the contractions are rhythmic and powerful, recurring about every twenty-two seconds.

There are generally three phases in the reflex process of gastric secretion:

1. The psychical phase, the afferent impulses originating in the mouth and nostrils (taste and smell), the efferent path being the vagus nerve;
2. The chemical phase, initiated either by the ingestion of active secretogogues, such as meat extracts, meat juices, soups, etc., or by the secretogogues which result from the digestive activities of the first stage;
3. The hormonic phase, in which, as the result of the absorption into the circulation of a hormone generated in the mucous membrane of the pyloric portion of the stomach, a marked increase in the secretion of gastric juice occurs.

From a surgical point of view we are especially interested in the hormonic phase of gastric secretion. The researches of Edkins,[5] already referred to, showing that hydrochloric acid secretion can be brought about by the intravenous injection of extracts from the pyloric mucous membrane, and those of McCrae and others, demonstrating that section of the pyloric nerve supply diminishes hydrochloric acid secretion, are complementary; and upon these researches are based the radical surgical procedures employed to-day in the treatment of gastric ulcer, which aim at the abolition of and in practice effect at all events a marked diminution in hydrochloric acid secretion.

With these facts before us, we are now in a position to consider the genesis of gastric ulcer.

The relation of erosions of the mucous membrane to the development of gastric ulcer has long been surmised. By erosion is meant a recent acute process resulting in the loss of mucosal or submucosal substance, but not involving the muscularis. Several theories have been advanced to account for the occurrence of erosions. We are indebted to Aschoff for a careful analysis of these theories and for the important recognition that not only are there two kinds of erosion — fundal erosions and "street" erosions—but that there are two phases in the development of ulcer, of which mucosal erosion is but one and the first.

While in the literature the two types of erosion are frequently described as on a parity, they should, from the point of view of gastric ulcer, be evaluated quite differently.

Fundal erosions occur in the body of the stomach and are localized almost wholly to the region of the greater curvature. The area of mucous membrane involved may be large and the erosions very numerous. In size they seldom exceed the diameter of a pin-head. They are blood tinged, and there is central loss of tissue. "Street" erosions are localized to the folds of the gastric pathway and its prolongation into the pyloric canal. They occur singly or in small numbers. They may be a centimetre or even more in diameter, and extend more deeply than do fundal erosions.

Neither type of erosion is thought to be due to direct infection, toxæmia, or mechanical factors. Fundal erosions are generally the outcome of persistent vomiting, and occur frequently in infants, in adults following abdominal operations, and in association with lesions of the brain and meninges. The underlying factor in their causation is thought to be a combination of vascular spasm and hyperæmia. This spasmogenic theory of origin is supported by experimental evidence. The technique which has invariably produced fundal erosions has not, however, produced lesions in the gastric pathway with the same uniformity, — further evidence that these two types of erosion should be considered separately. This variation in experimental results is explained partially at all events by the fact that the muscle systems of the gastric street and the corpus are not identical. The larger size of the erosions of the gastric pathway is to be accounted for on the basis of the difference in the vascular supply of the lesser and greater curvatures. It has been demonstrated by injection experiments that the border between the pyloric canal and the corpus is the zone of anastomosis of the vessels of the lesser curvature, which would account for a special tendency to the formation of anæmic foci in this location, that is at the isthmus. Ligation experiments upon these vessels have shown that areas in the mucous membrane of the gastric pathway remain more or less colourless, which suggests that spasm leading to temporary arterial blocking may account for these greater erosions and especially for the frequency with which they develop in the region of the isthmus. Erosions secondary to emboli may occur, but are probably infrequent. Secondary changes in the mucosa as a result of arterio-sclerosis are also most likely infrequent. As a matter of fact, the age incidence in the majority of cases of gastric ulcer excludes arterio-sclerosis as an important or constant factor. Generally speaking, the sclerotic changes found in the vessel walls in chronic ulcer should be looked upon as the result of chronic inflammation.

As we have already seen, the arrangement of the mucous membrane in the corpus and the gastric pathway is strikingly different, and during contraction of the stomach the longitudinal mucosal folds of the street are stretched out, while the mucosa of the corpus becomes loosely convoluted. With these facts before us and bearing in mind also the fact that it is into the gastric pathway that the concentrated specific digestive juices are expressed by the corpus, we can readily understand why the healing tendency is greater in the fundus, and why erosions in the "groove," exposed as they are to a longer contact with a more concentrated gastric juice than are fundal erosions, and subject to more violent peristaltic movements, are under peculiar disadvantage from the point of view of repair and tend to persist, to extend, and eventually to form chronic ulcers.

The increasing fixity of the mucous membrane of the gastric street as one proceeds toward the pylorus is one factor in the production of the funnel-shaped contour of the fully developed ulcer. A second factor is the peristaltic propulsion of the mucosa from the cardia toward the pylorus, the two factors together resulting in the overhang of the mucous membrane on the cardiac side, a formation recognized skiagraphically as Haudek's niche. These factors explain, too, why chronic ulcers of the lesser curvature occur most frequently at the isthmus. The penetrating tendency of "street" ulcers is also aggravated by the stagnation of gastric juice which occurs beneath the overhanging ledge of mucous membrane, penetration being more rapid on the oral than on the aboral side. Coarse food particles may also be retained within this protected funnel-like extension.

TREATMENT

The dietetic and medicinal treatment of chronic ulcer practised to-day wholly meets the requirements as we understand them. The liquid foods given excite but little gastric secretion and are rapidly evacuated. Medication is

designed to neutralize the secretion, which is always excessive in the presence of ulcer.

Gastric ulcers which show no improvement after six weeks bed rest under medication and a suitable diet should be explored. Apart from the disability which ulcer entails, one must consider that grave complications may supervene, namely, hæmorrhage and perforation. Then, too, in many cases the actual presence of primary malignant disease can not be excluded, and there is also the remote possibility that secondary carcinomatous change may occur in chronic ulcer. And here I would emphasize the fact that early cases of cancer, which have been diagnosed as ulcer, often improve temporarily upon the diet and medication prescribed for ulcer cases, and this improvement may be misinterpreted as a confirmation of the diagnosis of ulcer. The presence of free acidity is the rule rather than the exception in early cancer cases.

If operation be decided upon, one should certainly aim at the elimination of the lesion. The modern trend is more and more in favour of radical excision, which generally means the removal of the whole of the pyloric portion of the stomach and most of the lesser curvature. Moynihan, Crile, Finsterer, and Shumacher—to name a representative group of surgeons—are agreed that the pylorus and the greater part of the lesser curvature must be removed in order to eliminate permanently or at all events to curtail adequately hydrochloric acid secretion. As a matter of fact this procedure is not so formidable as it sometimes appears to be. In dilated stomachs the dilatation involves chiefly the antrum and pyloric canal, so that extensive resection may be performed without actual encroachment upon the corpus.

To recapitulate, we have to deal with two types of erosion—fundal erosions and erosions of the gastric street. The former develop particularly as the result of venous stasis and the spasmodic efforts of vomiting, the latter generally as the result of arterial obstruction, due to muscular spasm, more rarely as the result of emboli or arterio-sclerotic change. Fundal erosions, because of their small size, the redundancy and laxity of the mucous membrane, and the lesser concentration of the gastric juice in the zone bordering upon the greater curvature, tend to heal promptly, whereas street erosions because of their large size, their tendency to gape, their location in a zone of peristaltic unrest, and their longer exposure to a concentrated gastric juice, are less likely to heal, and it is in this type of erosion that the chronic gastric ulcer of the lesser curvature has its origin. Surgical treatment is designed to meet two conditions: (1) the removal of the lesion, and (2) the prevention of recurrence, by a permanent curtailment of gastric secretion, this being effected by the removal of the hormone-producing pyloric segment.

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Urea and Creatinine Contents of Blood in Renal Disease.—The investigation of the relationships between the urea and creatinine contents of blood was made by F. S. Patch and I. M. Rabinowitch, Montreal, because of a number of apparent anomalies which had been encountered and which could not be explained on the basis of technical errors. A large series of observations led to the finding of cases in which the general relationships between the urea and creatinine concentrations of blood were absent. In these cases, high urea values were found associated with normal or nearly normal creatinine values. This led to a special investigation of these cases. It was found that, in spite of high urea values, symptoms of uræmia were usually absent when the creatinine values were normal or nearly normal. It was also found that though high creatinine values and symptoms of uræmia were accompanied by positive diazo colour reactions, this was not necessarily so with high urea values. Since the different creatinine values could not be explained wholly on the basis of different rates of creatinine excretion, it was suggested that the greater part of what is regarded as creatinine is probably not creatinine. Chemical studies of some specimens of blood supported this view.—*J. A. M. A.*, April 7, 1928.

XUM

RENAL APLASIA AND HYPOPLASIA

A FACTOR IN RENAL SURGERY

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DURING every kidney operation, whether of a plastic nature, a nephrotomy or pyelotomy, or a nephrectomy, there arises the question: what is the condition of the opposite kidney? Can it carry on if this one is removed, or while it is temporarily functionless due to the trauma of handling?

In a certain number of the cases admitted to a urological service there is an absence of one or other kidney. This probability is given by Anders[1] as 1-1800 and by Motzfeld[11] as 1-1000; there are some 360 of these cases reported in the literature.

Now the relationship between absent kidney and kidney infection comes in, when we stop to think that the sole remaining kidney is most probably a damaged kidney. Ballowitz[3] stresses the frequency of calculus formation in the solitary kidney, while the combined statistics of Ballowitz,[3] Moore [10] and Anders[1] indicate that a greater than the normal percentage among subjects of congenital single kidney die of kidney complaints. What we particularly wish to stress is the inadvisability of kidney operations, without, first, a thorough investigation of the case, by means of x-ray, cystoscopy, pyelography and functional tests. Even then, in some cases, full knowledge will not be obtained. But how much less will one know if these tests are not carried out!

Now the embryology of these aplasias is evidently a lack of formation of the renal bud from the Wolffian duct. This results in complete absence of the kidney. Many of these patients show also some abnormality in the genital tract. Moore[10] states that "of 226 cases examined, in 33 per cent, more or less extensive congenital defects of the genital organs are recorded." In the male there is evidently a defect in the formation of the Wolffian duct itself, and in the female an associated defect in the Muellerian duct. A defect at a later period in embryonic life brings about the condition frequently seen in cases of absent kidney—that of normal genital formation with a normal bladder and ureteral orifices, but with a short rudimentary ureter, which may or may not be patent. The short rudimentary ureter is fairly frequently found, and, quoting Anders[1] again, "Out of the whole number of 286 cases reported, the ureter was completely absent in 240 cases. In twenty-four instances a more or less rudimentary ureter was in evidence without the slightest indication of the presence of renal structure." The defect in this latter instance would, no doubt, be due to lack of development of the nephrogenic tissue, the precursor of the secretory portion of the kidney, associated with a defective development of the ureter bud, and the failure of division into primary and secondary tubules.

In some of these cases a mass of connective tissue has been found in the region where the kidney should normally lie, but no mention has been made of finding any evidence of renal tissue (Lewis,[9] Gilmore[6]). It is reasonable to suppose that this defective development, whatever it may be due to, could occur at a slightly later period in embryonic life and leave some traces of fœtal or partially developed renal tissue, without forming in any way what could be called, anatomically, a kidney. Three of our cases are of this type. A defect arising at a later period would leave a more perfectly formed kidney, which may or may not function. These are of the type classified as hypoplasia. Many such have been reported in the literature, and two of our series would fall in this class. Such defective development has been considered by Coplin[4] to be due to defective arterial development, and coincides probably with the work of Bagg[2] on congenital defects in x-rayed mice. Bagg has given many instances of absent and rudimentary kidney following this procedure. In some animals the rudimentary kidney was no

larger than the head of a pin, while in many it was completely absent. Whatever may be the anatomical findings in each individual case, each one is non-functioning, and the diagnosis of such a condition is of extreme importance to the urologist.

When we look at these aplastic kidneys, we see a certain similarity in the picture. In each of Cases 2, 3, and 4, there was found a small mass of fat and connective tissue, containing nodules of firmer tissue, and in two, small thin-walled cysts. These nodules and cysts were connected by bands of fibrous tissue. They were supplied by one or more small blood-vessels, and in one instance a fibrous cord passed downward to become attached to the lower and patent portion of the ureter. Section of the nodules of tissue showed a predominating connective-tissue matrix, containing nests of cells, epithelioid in character, in many instances forming ducts, the lumina of some of these containing albuminous material resembling casts. In other portions rudimentary glomeruli could be made out. These were as a rule very few, and many were replaced by fibrous connective tissue, which in places showed hyaline degeneration. The cyst-wall was lined by flattened epithelium and made up of connective-tissue fibres. The cyst in Case 3 contained urea, creatinin, and sugar, in a proportion similar to that found in blood.

In Cases 5 and 6, there were found a definite pelvis surrounded by a shell of connective tissue, tubules, and a few glomeruli, many of which had been replaced by fibrous tissue. Whether these two cases are aplastic in origin, or whether they are the result of secondary atrophy, are questions not easy to answer. A case similar to No. 6 has been reported by Krotoszyner.[8]

The differentiation between renal aplasia and secondary atrophy is difficult to make histologically. Kaufmann[7] states: "there is no essential difference in the histological picture." Oertel[12] is of the opinion that in a secondarily atrophied kidney, there is usually some evidence of a ureter and a pelvis being present. In all probability Cases 5 and 6 might fall into the class of atrophic cases; but whether the atrophic process commenced in a kidney which was normal or in one that was hypoplastic in nature it is impossible to say.

In these 6 cases of aplastic kidney, the diagnosis made previous to operation was incorrect, but all cases had been investigated to the fullest extent.

Case 1

Mrs. P. L., aged 19, was admitted to the hospital July 16, 1926, suffering from pain in the right lumbar region, of four days' duration. The attack had commenced with aching pain in the right lower quadrant of the abdomen, followed shortly by similar pain in the right lumbar region, and more acute attacks radiating down the right leg. The following day the patient developed fever and chills and frequency by day, every half hour voiding small quantities, with marked burning on urination. She gave a history of right-sided pain with fever and chills during her first pregnancy, three years previously, but had no such symptoms during the second. She was admitted to the hospital on the day following the onset of her symptoms, and on examination appeared to be in marked pain, with frequent rigors and a temperature of 103 degrees. There was marked tenderness in the right costo-lumbar angle, also over the whole right side of the abdomen. The right kidney was easily palpable, enlarged, firm and tender. The left kidney was not palpable and not tender. There was no abnormality of the external genitalia. The urine was cloudy; straw coloured; acid in reaction; 1010 in specific gravity. Albumin +; sugar, none. Microscopically, there were present epithelial cells, motile bacilli, pus + +, but no red blood cells or casts.

One cubic centimeter of phenolsulphonephthalein intramuscularly gave: first hour, 10 per cent; second hour, 25 per cent; total 35 per cent.

On cystoscopy the bladder mucosa was found to be slightly inflamed. The right ureteral orifice was normal in position and appearance but the left was not made out. The right ureter was catheterized to the renal pelvis, and a specimen was obtained which showed microscopically: epithelial cells; pus + +; a few red blood cells and colon bacilli. X-rays, with a catheter in the right ureter, showed the tip of the catheter at the level of the third lumbar vertebra. No shadow was made out which would suggest calculus. A large right kidney shadow was noted, with no evidence of any kidney shadow on the left side.

The condition remained unchanged, with a temperature ranging between 104 and 105 degrees. The following day a decapsulation and nephrotomy was performed. It was noted then that the kidney was approximately double the size of a normal kidney. No abnormality of the vessels was noted. She was discharged three weeks later, with the wound healed. The renal-function test, as shown by phenolsulphonephthalein (1 c.c. intramuscularly), gave: first hour, 40 per cent; second hour, 30 per cent; total 70 per cent.

She was readmitted two months later, still troubled with pain in the right side; some tenderness over the bladder; and a frequency by day, five to six times by night, once, accompanied by burning urination.

On examination this time there was tenderness in the right costo-lumbar angle and the right kidney was enlarged, firm, and tender. There was slight tenderness along the course of the right ureter and over the bladder. The urine was clear; straw coloured; 1010 in specific gravity; acid; a faint trace of albumin was present but no sugar. Microscopically, there were scattered pus cells and some epithelial cells. The phenolsulphonephthalein test (1 c.c. intramuscularly) gave: first hour, 50 per cent; second hour, 20 per cent; total 70 per cent.

The blood-urea findings were normal; blood-urea, 0.420 grm. per litre of blood; blood-urea-nitrogen, 19.6 mg. per 100 c.c. of blood; creatinine, 1.29 mg. per 100 c.c. of blood. Cystoscopy at this time showed the bladder mucosa to be slightly inflamed and granular. The right ureteral orifice appeared to be normal. The left ureteral orifice could not be found; in fact there seemed to be

an absence of the trigonal ridge on that side. The right ureter was catheterized to the renal pelvis, and clear amber urine was obtained, containing a few red blood cells and white blood cells. Culture of this specimen gave no growth. A pyelogram, with 4 c.c. of 12 per cent sodium iodide solution in the right pelvis, showed a very large kidney shadow, with only a partly filled large renal pelvis. Indigocarmine injected intravenously appeared from the right side in 2.5 minutes, but none appeared from any portion of the left side of the bladder or urethra.

CASE 2

Mr. H. W., aged 31, was admitted July 30, 1925, complaining of a frequency from which he had suffered for the last two years. Four days previously he had had an attack of colicky pain on the right side, and later, from that time on, he had burning on urination. He gave no history of other symptoms. As a child he had suffered from infantile paralysis, scarlet fever, mumps, and chickenpox. His general examination was negative, apart from some atrophy of the left leg, and paralysis of the muscles below the knee. The blood-pressure was systolic 120, diastolic 80.

Examination of the genito-urinary system showed no costo-lumbar tenderness; the kidneys were not palpable; there was slight ureteral tenderness on the left side, but none on the right. There was no suprapubic tenderness or distension. The external genitalia and prostate were normal. His urine was clear straw coloured; specific gravity, 1020; and some albumin was present, but no sugar. Microscopically, there were pus, motile bacilli, epithelium, and calcium oxalate crystals.

His renal function by the phthalein test, intramuscularly given, was apparently normal: first hour, 55 per cent; second hour, 15 per cent; total, 70 per cent. The blood Wassermann test was negative. No tubercle bacilli were demonstrated in the bladder urine on several examinations.

A roentgenogram of the kidney and bladder region showed a small round shadow opposite the fifth lumbar vertebra on the right side.

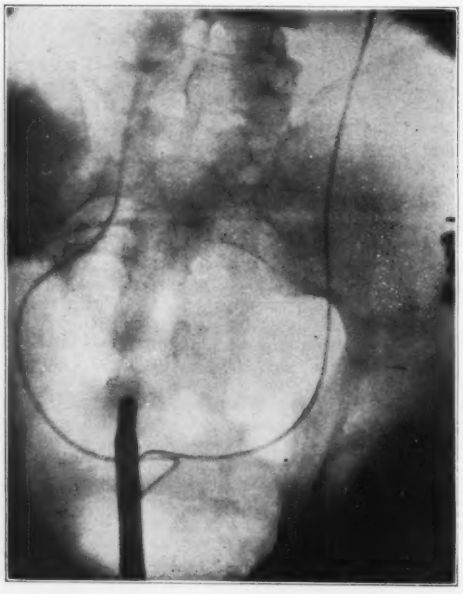

FIG. 1.—Skiagram of Case 2, showing the left catheter in the renal pelvis, and the right catheter obstructed at the sacro-iliac synchondrosis. No shadow was seen which would suggest a calculus.

At cystoscopy, the bladder mucosa was found to be slightly inflamed. The ureteral orifices, in normal position, appeared to be slightly gaping. The left ureter was catheterized to the renal pelvis, and a specimen was obtained. The right ureter could be catheterized for only half the distance, and no specimen was obtained. The specimen from the left kidney showed an occasional red and white blood cell, and a few epithelial cells; culture gave a growth of *B. coli communis*. A roentgenogram, with catheter in position, showed the left catheter up in the renal pelvis, but the right only at the sacro-iliac synchondrosis. No shadows were seen suggestive of calculus, or of the previously noted shadow. A second cystoscopy confirmed these findings. Also, indigocarmine injected intravenously showed in the urine from the left side in 15 minutes, but none appeared from the right side (Fig. 1).

A diagnosis was made of a probable closed tuberculous lesion of the right kidney, and operation was performed on August 6, 1925. On exposing the right kidney area, only a small mass of fat and fibrous tissue was found, containing several small nodules of a firmer tissue. Attached to these were several small blood vessels. No ureter could be found. The mass of tissue was removed from a small indefinite pedicle. There was no other evidence of kidney tissue (Fig. 2).

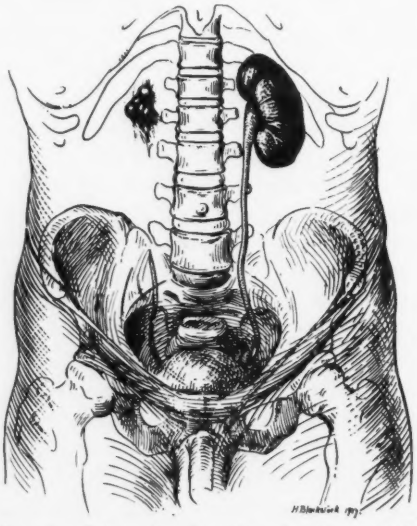

FIG. 2.—Schematic drawing showing nodules of rudimentary renal tissue in the right kidney region of Case 2. The nodules were connected by fibrous bands. The lower portion of the ureter was patent to the sacro-iliac synchondrosis. The upper portion was not found at operation.

The report of an examination by Dr. Waugh, of the Pathological Department, was as follows: "Specimen consists of a mass of reddish tissue of rubbery consistency, about 30 grm. in weight. At one end is a cyst with a smooth pale wall. It is the size of a small walnut.

"Sections of the tissue show it to be made up of an irregular mass of loosely arranged fibrous connective tissue, containing numerous larger and smaller blood vessels. There are occasional peculiar duct-like structures, containing blue staining, more or less homogeneous, material, and lined by small irregular cells, having little resemblance to epithelium, but probably being atrophic, degenerated and necrotic undifferentiated lining. The cyst wall consists of a wavy fibrous connective tissue, without epithelial lining. Hyaline fusion of the fibrous connective tissue is occasionally seen. There is no

evidence of inflammatory changes in the tissue: Diagnosis: Aplasia of kidney."

The patient developed bronchopneumonia about ten days after the operation, but soon recovered. When heard from six months later, he was free from symptoms, had gained in weight and strength, and was able to go about his work as usual. He has had no recurrence of pain on the right side since his operation.

Case 3

Mrs. D. F., aged 33, was admitted to hospital, complaining of severe pain in the left loin, which had awakened her from sleep four days previously. Frequency five or six times by day, and once by night, had appeared two days later. Slight burning accompanied urination. She gave the history of having had an attack of acute pyelitis on the right side four years previously, and had suffered from a slight dragging pain on that side for the past six months. She had one child, ten years of age, alive and well. Her general condition was normal. The blood-pressure was systolic 120, diastolic 70.

Examination of the urinary system revealed no costo-lumbar tenderness. The kidneys were not palpable, and there was no tenderness over the kidneys, nor along the course of the ureters. There was no suprapubic distension or tenderness. The genitalia were normal externally and by vaginal examination.

The urinalysis showed urine of a hazy straw colour; specific gravity, 1028; reaction, acid; no albumin or sugar; epithelial cells, a few white blood cells, and a few motile bacilli were found in the bladder urine. A roentgenogram of the kidney and bladder region was negative for calculi. One cubic centimeter of phenol-sulphonephthalein was given intramuscularly, and 65 per cent was excreted in two hours.

The blood-urea findings were normal: blood-urea, 0.288 grm. per litre of blood; blood-urea-nitrogen 13.4 mg. per 100 c.c. of blood; creatinine, 1.29 mg. per 100 c.c. of blood. The blood Wassermann test was negative.

At cystoscopy the bladder mucosa was normal. The ureteral orifices were normal in appearance, shape, and position. The right ureter was catheterized to the renal pelvis, and a specimen was obtained. The left catheter was obstructed in the lower ureter, and no specimen was obtained. The right specimen showed cloudy straw coloured urine, containing a few red and white blood cells and some epithelial cells. Examination by x-rays, with the catheters in position, showed the right catheter in the renal pelvis at the tip of the third lumbar vertebra. The left was at the sacro-iliac synchondrosis, but no shadow of a calculus was seen. (Fig. 3). A second cystoscopic examination confirmed these findings. A ureteropyelogram was attempted on the left side, but no shadow of iodide fluid was seen. Indigocarmine injected intravenously appeared from the right side in four minutes, but none appeared from the left side in fifteen minutes. The condition was thought to be an advanced left renal tuberculosis, and operation was performed. On opening the left loin we saw a small mass of tissue in the kidney bed. This consisted of several rounded cyst-like bodies, one the size of a plum, the other much smaller. No ureter could be made out. The pedicle, consisting of several small vessels, was ligated and the mass removed. The two cystic masses were connected by fibrous-tissue bands. (Fig. 4).

Fig. 3.—Skiagram taken at cystoscopy in Case 3, showing the right catheter well up, but the left catheter obstructed just below the sacro-iliac synchondrosis. No shadow was seen suggestive of calculus.

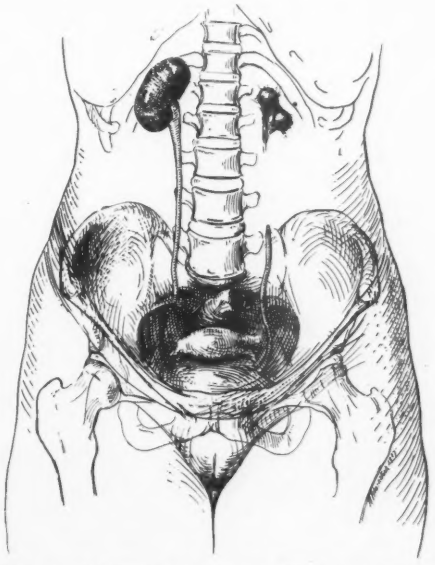

Fig. 4.—Schematic drawing showing two cysts connected by fibrous bands in Case 3. The lower portion of the ureter was patent; the upper portion, absent.

Incision of the cysts revealed a more or less viscid fluid, dark amber in colour, about 15 c.c. from the larger and 5 c.c. from the smaller. This fluid showed on examination approximately the same findings for urea, etc., as in the case of blood: urea, 0.360 grm. per litre of fluid; urea-nitrogen, 16.80 mg. per 100 c.c. of fluid; creatinine, 1.59 mg. per 100 c.c. of fluid; sugar 0.093 per cent.

Examination of the tissue removed showed an irregular, dense, fibrous tissue, with areas of hyaline fusion, containing nests of poorly developed tubules, the lining epithelium of which was swollen, so that its differentiation was lost. The lumina were filled with hyaline casts. Glomeruli were rare and the capillaries in Bowman's capsule were disintegrating. Sections of the cyst wall showed it to consist of a thin capsule of fibrous connective tissue, having an inner margin of flattened epithelial cells. Diagnosis: aplasia of kidney with multiple cyst-formation in rudimentary tubules.

The patient has much improved, has gained forty

pounds in weight, and has been free from symptoms since operation.

CASE 4

Mr. D. St. G., aged 30, was admitted to the hospital on May 27, 1926, complaining of anuria of four days' duration. He had been suffering from slight attacks of pain in both loins for the two previous years. These attacks were accompanied by some burning urination. He had a slight attack of pain in the right loin, radiating down to the groin, shortly before the onset of the anuria. The history apart from this was negative. On admission the patient appeared to be in distress, though there was no vomiting or nausea, and no œdema of face, hands, or feet, and mentally he was quite clear. The tongue was coated and dry. The eye grounds were normal. General examination was negative. The blood-pressure was, systolic 110, diastolic 75.

Examination of the genito-urinary system revealed no costo-lumbar tenderness. The kidneys were not palpable, though there was slight tenderness in the left loin on bimanual palpation of that side. No masses were palpable in the loins. There was no tenderness along the course of either ureter, and no suprapubic distension. The penis was normal in conformation. No discharge was present. The urethra easily admitted a No. 16 soft rubber catheter, but no urine was obtained from the bladder. The scrotum and its contents were normal. The prostate *per rectum* appeared to be normal to the examining finger. A roentgenogram of the kidney and bladder region did not show any shadow, which would suggest calculus. The blood-urea findings at the time were: blood-urea, 1.42 grm. per litre of blood; blood-urea-nitrogen, 66.36 mg. per 100 c.c. of blood.

He was treated symptomatically with heat to the loins and the electric baker; intravenous salines of 10 per cent glucose were administered. The following day he had not voided and was cystoscoped. The bladder was symmetrical, the mucosa normal; the ureteral orifices, normal in contour and position. The right ureter was catheterized for a distance of about 4 cm., when definite obstruction was met. The left ureter was catheterized for about 15 cm., when definite obstruction was met. No specimens of urine were obtained. Roentgenograms taken with the catheters in position showed both in the relative positions mentioned, but no shadows were seen suggestive of calculi. No clearly defined kidney shadows were seen. The cystoscopy was repeated the following day, but with the same negative results (Fig. 5).

FIG. 5.—Skiagram taken at cystoscopy in Case 4, showing the right catheter obstructed about 3 cm. beyond the ureteral orifice, and the left about the 4th lumbar vertebra. No shadows were seen suggestive of calculi.

On the morning of May 31st, he had still not voided any urine, and it was seen that his condition was critical. He had become nauseated and was vomiting all fluids taken. He had become œdematous, and was also somewhat cyanosed and dyspnœic. An operation was indicated as the last possible means of relief, as he had not voided for seven days.

In view of the history of pain on both sides, and the slight tenderness noted on the left side at examination, that side was opened first. His blood-urea at this time had risen to 2.076 grm. per litre of blood; blood-urea-nitrogen, 97.08 grm. per 100 c.c. of blood.

The opening of the left loin revealed the tissues to be markedly œdematous. No perirenal capsule was found and no kidney. In the region where the kidney should be there was a small mass of fat and fibrous tissue, containing several rounded masses of firmer tissue. Several small vessels entered this, forming a pedicle. From this mass also a fibrous cord ran downward toward the bladder. This mass of tissue was removed (Fig. 6).

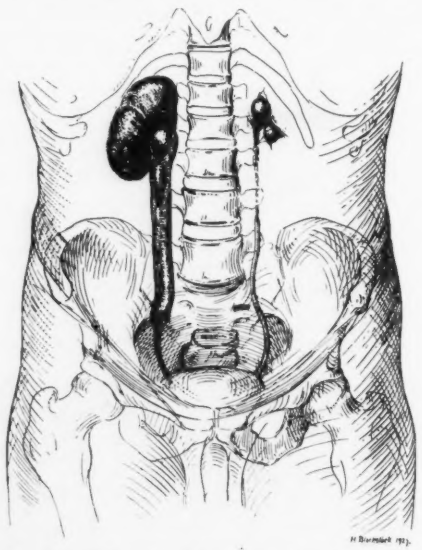

FIG. 6.—Schematic drawing of Case 4, showing nodules of aplastic kidney tissue in the left renal region. The lower portion of the ureter was patent; the upper, represented by a fibrous cord connected with these nodules. Stricture in the lower portion of the right ureter, with hydro-ureter and hydronephrosis present.

The right loin was opened and a slightly larger than normal kidney found. The surface appeared to be slightly granular, and was a darker red than is usually seen. The pelvis and ureter were markedly dilated, and the wall of the ureter much thinned out. An opening was made at the ureteropelvic junction and a large quantity of clear pale urine escaped. A bougie was then passed downward and met with obstruction in the pelvic portion of the ureter. This was overcome and a No. 12 bougie was passed to the bladder. A tube was then inserted in the opening in the pelvis for drainage.

His condition improved immediately upon the establishment of drainage. A large quantity of urine drained from the loin for two weeks, after which the right ureter was dilated to No. 9 F., and the patient voided, and several days later the wound became dry. The urine

passed was pale, and of a low specific gravity, 1008-1010. There was some slight infection with colon bacillus, following the operation. The small specimen removed from the right side was examined by Dr. T. R. Waugh, of the Pathological Laboratory, and his report is as follows:—

"Specimen consists of some fat tissue, in which are a few filbert-sized masses of firmer tissue. Section shows irregular masses of fat cells connected by a loose fibrous stroma. In some areas are irregular tubular spaces lined by a regular layer of cuboidal epithelial cells. These large pale cells appear of the embryonic type, the arrangement resembles the anlage of convoluted renal tubules. There are also tufts of cell resembling glomeruli coutaining red blood cells. There is a dense fibrous tissue stroma surrounding these structures and numerous thick-walled vessels are seen. There is no related definite kidney parenchyma, although metanephritic blastoma with tubular and glomerular formations was found.

Diagnosis: aplastic kidney; congenital malformation of metanephros."

The patient was seen in October, 1926, when he had gained in weight and strength. He was free from symptoms, but his urine was still of low specific gravity, and there were scattered pus cells and colon bacilli in the urine. Blood-urea, 0.775 grm. per litre of blood; blood-urea-nitrogen, 35.3 mg. per 100 c.c. of blood.

When he was seen again in January, 1927, his urine still contained scattered pus, and was of low specific gravity. The phenolsulphonephthalein output was 20 per cent for two hours: blood-urea, 0.660 grm. per litre of blood; blood-urea-nitrogen, 30.8 mg. per 100 c.c. of blood. The right ureter easily admitted a No. 6 catheter, and there was no hydronephrosis.

Case 5

Mrs. E. M., aged 40, was admitted to the hospital first in 1914, suffering from incontinence of urine following a birth trauma which had occurred in 1913. She had complete incontinence of urine. Her general examination was negative, the blood-pressure was systolic 140, diastolic 88. Cystoscopy showed a small bladder containing about one ounce of thick creamy pus. The mucosa was inflamed. There was a large opening toward the right side on the floor, communicating with the vagina. The left ureteral orifice was normal. This was catheterized and normal urine was obtained. No right ureteral orifice could be demonstrated, and indigocarmine injected intravenously appeared from the left ureter but not from the right side. A plastic operation was performed. This was successful for some months, but incontinence reappeared.

It was found on the next admission that a small fistula from the bladder communicated with the cervix and a hysterectomy was performed. Examination of the urine from the left kidney showed at this time some evidence of infection. She was admitted to the hospital in 1920, suffering from fever, chills, and pain on the left side, and also incontinence of urine. A small vesicovaginal fistula was present.

Cystoscopy and catheterization of the left ureter showed an infected hydronephrosis. An x-ray picture with the catheter in place, showed a marked kink in the lower left ureter, with the catheter coiled downward toward the iliac crest, evidently a stricture which had resulted from trauma at the time of the hysterectomy.

She again entered the hospital in 1923 in uræmia, and died shortly after admission.

Examination showed a large distended pyonephrotic sac on the left side, with the lower portion of the ureter narrowed and bound down in a mass of scar tissue. Examination of the right kidney showed a small mass of kidney tissue about the size of an almond, covered with a thick fibrous capsule. The pelvis was small, but the ureter appeared about the normal size. About 3 or 4 cm. from the bladder it was completely stenosed and became lost in a mass of scar tissue about the bladder. Microscopically, the kidney appeared to be made up of a mass of fibrous tissue, with a few small blood vessels showing hyaline degeneration of their walls. An occasional tubule, with a flattened epithelial lining, and a few glomeruli, which had undergone invasion by fibrous tissue, were seen scattered throughout the fibrous tissue, of which this was mainly composed.

Case 6

L. M., boy, aged 9 years, was admitted to hospital May 5, 1924, complaining of frequency by day of five to six times, and cloudy urine, which had been noted by parents for the past three years. He had also suffered from enuresis since childhood. On examination he appeared to be well developed and nothing abnormal was noted. His blood-pressure was systolic 108, diastolic 65. The genito-urinary system on examination showed no costo-lumbar tenderness; the kidneys were not palpable. There was no ureteral tenderness, and no tenderness nor distension of the bladder. His urine was cloudy amber; specific gravity, 1020; acid; albumin +; no sugar; microscopically, it showed pus, a few red blood cells, and a few cocci; no tubercle bacilli were found in the bladder urine. The phenolphthalein test, 1 c.c. given intramuscularly, showed: first hour, 30 per cent; second hour, 22 per cent; total 52 per cent. X-ray of the kidney and bladder region did not show any shadow

Fig. 7.—Aplastic left kidney and hydro-ureter removed from Case 6—a boy 9 years of age. The ureter was enormously dilated and tortuous, with a narrow stricture at junction with bladder. The kidney is a shell of connective tissue, containing a few glomeruli and rudimentary tubules.

suggestive of calculus. Cystoscopy showed a rather tight anterior urethra, a No. F. 18 cystoscope being used. The bladder was symmetrical, the mucosa slightly inflamed. The right ureteral orifice was normal. The left ureteral orifice was scarred and gaping. The left ureter could not be catheterized. Normal urine was obtained from the right side (Fig. 7).

From the age of the boy, the frequency and the condition of the ureteral orifice, a diagnosis of probable tuberculous kidney was made and operation performed. At operation the left kidney was found to be small, scarred, with slightly distended renal pelvis, and a markedly dilated and tortuous ureter filled with purulent material and adherent to the surrounding tissues. The kidney and ureter were removed with difficulty. The kidney was a thinned-out fibrous sac surmounting the dilated pelvis and ureter. Microscopically, it showed a thin wall, made up of fibrous connective-tissue, a few small blood vessels and the hyaline remains of many glomeruli. A few tubules were also noted.

The patient made an uneventful recovery. He has since gained in weight and apart from one attack of hæmaturia six months later, from the ulceration about the left ureteral orifice, has been free from symptoms.

SUMMARY

In *Case 1*, the patient was admitted complaining of frequency, dysuria, chills and fever, pain in the right loin. A diagnosis, after investigation, was made of acute right pyelonephritis, and a pyelotomy and nephrotomy were performed. Nephrectomy was not considered at operation, as the condition of the left kidney had not been ascertained. Later investigation showed it to be absent.

In *Case 2*, the patient was admitted complaining of frequency for two years and burning on urination, with colicky pain on the right side at intervals. After examination, a diagnosis was made of probable closed renal tuberculosis. Operation showed an aplastic kidney.

In *Case 3*, the patient was admitted complaining of severe pain in the left loin, frequency and burning on urination. After examination a diagnosis was made of destroyed kidney, probably tuberculous in origin. Operation proved this to be an aplastic kidney, similar in nature to that in Case 2.

In *Case 4*, where the patient was admitted on the fourth day of an attack of anuria, he had complained of pain on both sides. The x-rays were negative for calculi, and at cystoscopy neither ureter could be fully catheterized to the renal pelves. Operation showed an aplastic kidney on the left side, and a stricture of the right ureter with hydronephrosis. This case, and also the first, are of the type on which nephrectomy of a solitary kidney could quite easily be performed without adequate and complete investigation.

In *Case 5*, the patient was found to have a large left pyonephrosis, and later at autopsy an atrophied, aplastic right kidney. A radical operation on the left kidney would naturally have ended fatally.

In the last case, the diagnosis was made of left renal tuberculosis, with probably a marked destruction of kidney tissue. At operation an aplastic kidney, with a large pyo-ureter was found.

CONCLUSIONS

The conclusions to be drawn from the series are:—

1. That aplasia of the kidney occurs frequently enough to be borne in mind when considering a nonfunctioning or very low functioning kidney.

2. That it appears to be more common on the left side.

3. That pain is occasionally referred to the side of the aplastic kidney.

4. That kidney operations should not be undertaken without previous cystoscopic examination, and without complete evidence of the existence of a second kidney.

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T. E. Osmond has applied the Wassermann, Kahn, and Sigma tests in the case of 2,019 serums. He finds that there is a high percentage of agreement between the three tests. The results were slightly, but definitely, in favour of the Kahn. The Kahn test remains positive longer than the Wassermann in cases of syphilis under treatment. The chief advantage of the Kahn test is its simplicity. A reliable result can be given within an hour of receiving the serum.—*Brit. M. J.*, 1928, i, 440.

SARCOMA OF THE PROSTATE GLAND

A REPORT OF TWO CASES*

BY RALPH E. POWELL, M.D.

Montreal

SARCOMA of the prostate is a comparatively rare condition and, in spite of the recent reports of Bugbee, Bumpus, Kretschmer, Smith and Torgerson in 1926, a short review of the condition and the report of two new cases may prove of interest.

Although more commonly met with in infants, it is occasionally found in the adult and senile prostate. Authorities agree fairly well on the following age incidence: 50 per cent under 10 years of age; 25 per cent between 10 and 30 years; 5 per cent between 30 and 50 years; 20 per cent after 50 years.

The lesion in the prostate may be primary; or secondary, from involvement of adjacent tissues—neoplastic transformation of the vesicle, bladder, testicle, corpora cavernosa or rectum.

The symptoms in the adult begin insidiously and are usually referred to the bladder, owing to the difficult urination, even to the point of complete urinary retention. In infancy the symptoms are more frequently referred to the rectum, due to the bulging of the perineum and intestinal obstruction. In the two cases here reported, the senile patient developed urinary retention; the second, the infant, developed prolapse of the rectum and intestinal obstruction. Pain is a late symptom and due either to obstruction of the urinary outflow or to pressure on the sacral plexus. Rectal examination always reveals a tumour mass in the prostate. Usually there is a supra-pubic prominence which does not disappear with catheterization. Metastases may be found in the skin, bones and scrotum.

The patient's general condition is fair until the condition is advanced, when cachexia and urinary infection lead to speedy impairment of health. In the infant the course is very rapid; six to nine months. In the old the course tends to be more chronic.

The neoplasm shows many histological variations, which may, perhaps, be tabulated as follows:—

A. A TYPE COMPOSED OF A SINGLE TISSUE.
1. Globo-cellular sarcoma.
2. Lymphosarcoma.
3. Sarcoma showing cellular fusion.

B. A TYPE SHOWING MULTIPLE TISSUES.
1. Myxosarcoma.
2. Angiosarcoma.
3. Chondrosarcoma.
4. Fibromyoma.
5. Rhabdomyoma.
6. Adenosarcoma.
7. Myosarcoma.

The differential diagnosis must be made clinically from: sarcoma of the seminal vesicle; hydatid cyst of the pelvis; perineal abscess; simple prostatic adenoma; carcinoma of the prostate.

Treatment offers little. Operation is useless because of advanced infiltration before clinical symptoms are noticed. Deep x-ray and radium need only be mentioned.

Two cases, the first in an adult, the second in an infant, have passed under our care in the Montreal General Hospital, showing these widely divergent symptoms.

CASE 1

The patient, a man aged 63, complained of frequency and difficult urination; pain across the hips. *Personal History* was negative. *Family History* was not important.

Present Illness began one year ago with difficulty and frequency of urination, gradually increasing but never going on to retention. Nothing abnormal was noticed in the urine. Four months ago pain began across the hips and in the rectum. The bowels were always regular, with normal movements.

Condition on Admission.—A well-developed, well-nourished male; skin and musculature normal. The inguinal glands were very slightly enlarged. Chronic emphysema was present, with some arterio-sclerosis. All superficial arteries thickened and tortuous. Blood-pressure: systolic, 150, diastolic 80. The heart was normal in size, sounds muffled; electrocardiogram normal; Wassermann negative.

Digestive and nervous systems were normal.

Blood Examination.—Red blood cells 4,800,00 per c.mm.; white blood cells 8,200 per c.mm.; hæmoglobin 82 per cent.

Genito-Urinary System.—Neither kidney was palpable. There was a tumour reaching to the umbilicus which disappeared on catheterization. The residual urine measured 800 c.c. Recent epididymitis was noted on the left side. Rectal examination revealed a very large, smooth, fixed mass, soft, with medium sulcus of the prostate obliterated. The upper limit of the mass could not be reached with the examining finger. The mucous membrane of the rectum was normal. A French 21 cystoscope was passed with some difficulty and

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showed the bladder mucosa trabeculated but no evidence of cystitis; the prostate projected into the bladder, with a large acute-angled notch on the superior surface; the ureters were hidden.

Diagnosis.—Adenoma of the prostate of unusual extent.

Examination of Urine showed as follows: reaction acid, and specific gravity 1032; albumin negative; blood-urea-nitrogen 46; creatinine 1.77.

X-ray showed nothing in the genito-urinary system, and no evidence of metastases elsewhere.

Acute retention developed the day after admission. Suprapubic cystotomy revealed a very large, soft prostate. The patient's bladder was drained for three weeks; the blood-urea-nitrogen showing steady improvement.

First day after operation.—Blood-urea-nitrogen 34, creatinine 1.2.

Third day.—Blood-urea-nitrogen 20; creatinine 1.29.

Sixteenth day.—Blood-urea-nitrogen 18; creatinine 1.2.

Twenty-first day.—An attempt was made to enucleate the prostate. The examining finger broke into a huge necrotic cavity. The diagnosis of sarcoma was made and the necrotic tissue, with other portions of growth was removed for pathological examination. A Freyer's tube was put in for drainage, and later changed to a De Pezzer catheter.

The patient was discharged from hospital five months later in good condition, having received five treatments with the deep x-ray. He died one year after admission to hospital, or two years after the onset of his first symptoms.

Pathological Examination.—The gross specimen consisted of numerous pieces of tissue, varying in size from 0.5 cm. to 2.5 cm. in diameter. The appearance was that of minced meat, of reddish yellow colour, soft and mushy in consistency.

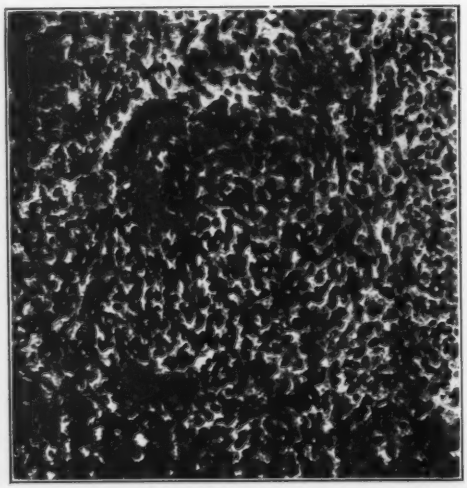

FIG. 1.—X 200. Fibrosarcoma of the prostate (Case 1).

Microscopically, the sections showed mostly necrotic, unrecognizable tissue, with a few islands of cells surrounding the blood vessels. Where the cells were well preserved they were seen to be elongated, and occasionally round, with comparatively large nuclei. In other, better differentiated, fields the cells were spindle-shaped, and showed pale staining intercellular substance, similar in all ways to collagen. There were numerous mitotic figures among the less differentiated cells, but no giant cells. It seemed to be a very rapidly growing tumour. Diagnosis.—Fibrosarcoma.

CASE 2

An infant, ten months old, was admitted to hospital November 3, 1926.

Complaints.—Constipation and prolapse of the bowel.

Personal History.—A full-term normal child; breast fed until one month ago.

Family History.—Negative.

Present Illness.—The child was perfectly well until two months ago, when the mother noticed that it was constipated. Under laxatives the condition was relieved, this until two weeks prior to admission, when the movements because very painful and were followed by prolapse of rectum.

Condition on Admission.—A well-nourished, well-developed child. Intergumentary respiratory, circulatory and lymph-glandular systems were normal. Constipation and prolapse of the rectum were noted. The liver and spleen were not palpable. The lower right quadrant of the abdomen revealed a large mass attached to the posterior wall, extending into pelvis. Rectal examination revealed a large tumour mass, continuous apparently with the suprapubic mass and filling the whole pelvis. The child was emptying the bladder with incontinence. Emptying of the bladder however did not alter the contour of the suprapubic tumour.

Diagnosis.—Sarcoma of the prostate, with chronic intestinal obstruction.

Colostomy was done to relieve a complete obstruction which developed three days after admission; there was no evidence of an intraperitoneal tumour. The diagnosis was confirmed. The child lived for four weeks, going rapidly down hill to severe cachexia.

Autopsy report showed the following conditions:—

On opening into the peritoneal cavity, it was found that the whole pelvis and part of the lower abdomen were filled with a hard tumour mass, which had displaced the bladder and rectum forward. It was the greatly distended bladder which gave the feeling of fluctuation from the outside; its upper margin was about three fingers' breadth above the umbilicus. This tumour mass appeared to be attached firmly to the sacrum and the left side of the pelvis, and to a lesser extent to the right side; it was quite impossible to separate it from the pelvic bones without tearing. On cutting through the symphysis pubis it was found that the tumour surrounded the beginning of the penis and was spreading anteriorly in the subcutaneous tissue. Superiorly, this mass was considerably above the brim of the pelvis and appeared to involve the prevertebral lymph glands. The bladder was opened at this time, to aid in finding the prostate gland. A probe was pushed down the urethra and palpation for the gland carried out. No gland was

FIG. 2.—X 800. Mixed-celled sarcoma of the prostate. (Case 2).

found, and there was no gross obstruction to the urethra. The tumour mass was separated from the pelvic wall and portions of the symphysis pubis, tuber ischii, and sacro-iliac synchondrosis were removed for specimens. These were the points to which the tumour was most firmly attached. The left hip-joint was opened and found to be quite free. The mesenteric lymph-nodes did not appear to be enlarged above normal.

The kidneys and bladder were taken out with the tumour mass and left attached to it. Both kidneys had double ureters. The bladder, ureters, pelves and calices were all distended. The cortex was thinned to about 0.15 cm.; medulla measured about 1.2 cm. in both kidneys. The calices showed a marked hydronephrosis. The kidneys were lobulated, and the capsule stripped readily.

The rectum was greatly displaced and much pressed upon by the tumour mass and the pelvis. The sigmoid formed a colostomy. The lumen of the rectum felt quite smooth and did not appear to be the starting point of the tumour. The remainder of the tract showed no gross lesions.

The right testicle was considerably enlarged and looked œdematous. Cross section showed two areas filled with fluid, but no tumour growth.

Microscopical Examination.—Kidneys.—The capsule was œdematous and infiltrated slightly by mononuclear and occasional polymorphonuclear leucocytes. The glomeruli were slightly distorted, but there was no cellular infiltration, and no undue congestion. The tubules were dilated, and in many cases filled with pale pink staining hyaline material which in some cases was infiltrated with small round cells.

Tumour.—The tumour was composed of large spindle and polyhedral cells, many with several nuclei, with an indefinite intercellular substance resembling smooth muscle or collagen. The cells contained large amounts of cytoplasm, as a rule, which was pink-staining, but no dots or centrosomes were present, as is usual in striped muscle tumours. No striations could be found with phosphotungstic acid stains, but collagen was present and occasional fibroglia fibrils.

The bibliography of sarcoma of the prostate has been so exhaustively reviewed in the articles of Kretschmer (*American Urological Journal*, 1926, vol. xvi) and by Smith and Torgerson (*Surgery, Gynecology and Obstetrics*, 1926, vol. xliii), that little of moment can be added.

Apparently the five cases reported by Bumpus and the two by Kretschmer were not mentioned in Smith and Torgerson's review. These, with the two I have reported (and I can find record of no others since), make a total of ninety-three reported so far in the literature.

BENIGN MIXED TUMOURS OF THE KIDNEY

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IN the discussion of mixed tumours of the kidney attention is usually given to those malignant neoplasms observed in children under ten and rarely arising at a later period of life. This group of renal tumours in children is individual in its character, and has been fully discussed by Ribbert, Wilms, and others. There is, however, another type of tumour which, because of the complexity of its tissues, belongs to the group of mixed tumours. This form is benign in character and occurs in adults. Because of the prominent nature of one or more of the elements in the tumour mass, it has been spoken of as lipoma, myoma, fibroma, lipomyoma, and the like, without drawing attention to the fact that these masses are of the nature of mixed tumours, and probably arise in a manner not unlike mixed tumours in other regions. Two cases of this kind have come to our attention.

Case 1

F. B., female, aged 49 years. In January, 1917, she complained of irregular pains in the shoulders and up the back of her neck. She had noticed an increasing waist-line for the past six months. The positive findings on examination were: a large fluctuant mass filling the upper abdomen between the umbilicus and xiphoid process, and extending further toward the right than to the left; a singing bruit over the upper part on auscultation. At operation this was found to be a large soft tumour, fairly regular in contour, the contents of which were markedly blood-stained. It was situated between the layers of the falciform ligament, which had to be split to remove it.

On January 26, 1927, the patient reported a second time, with a large mass filling the left upper abdomen. It was lobulated, firm in consistency, and did not appear to be intimately associated with the kidney, spleen, or liver. At operation in September, 1927, a large retroperitoneal tumour was found which was inseparable from the left kidney and was adherent to the vena cava. The left common iliac vein was found to be greatly lengthened and wound about the lower margin of the tumour. The tumour and kidney were removed *en masse*.

The dimensions of the tumour removed (January, 1917) from the falciform ligament are not available; it weighed 4,990 grammes. In general appearance it was identical with the mass surrounding the kidney in the second case, so that one description will suffice. The tumour mass removed at the second operation consisted of two main portions. The larger measured 24 x 18 x 8 cm., and was dark red in colour with bluish red blotches rising above the surface. The smaller portion measured 16 x 11 x 6 cm., and was of a reddish yellow colour and of firm consistency. On section, each mass, like the one from the falciform ligament,

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had a fatty appearance and variations in colour were due chiefly to hæmorrhagic areas of different age and magnitude. The kidney which was dissected free from the smaller was very irregular in shape and measured approximately 14 x 9 x 5 cm. In it were numerous fatty masses, raised above its surface, measuring from 0.5 to 4 cm. in diameter. On section, these areas were found to be distributed throughout the cortex and medulla in an irregular fashion. They seemed to consist of fat tissue held in a delicate fibrous tissue. Some of these masses were well defined while others had no definite limitation.

While in some cases these tumour nodules were definitely circumscribed, this could not be shown in all of them. The cells observed most constantly were those of smooth muscle tissue. These cells varied considerably in size, shape, and staining quality. They were, for the most part, long and spindle-shaped with a definitely hyperchromatic nucleus. They were observed to assume a peritheliomatous arrangement about the large blood-channels which were found through and in proximity to every tumour nodule. They also extended into the surrounding kidney tissue as bands, and were associated with degenerations and replacement of kidney structures. These cells grew in an intertwining manner to form small tumour nodules which contained but little fatty tissue. They were also found in bundles in the central portions of the larger fatty masses.

Van Gieson's stain showed these bundles to consist of both smooth-muscle fibres and fibrous connective-tissue cells. The smooth-muscle cells occupied the field chiefly about the large blood vessels, as indicated above, and many of the tumour nodules were composed almost entirely of this type of cell. Those of the fibrous-tissue type were scattered more irregularly, forming the stroma of the tumour nodule and extending through the kidney substance.

The presence of the large blood-channels was very striking, and the frequency of their occurrence seemed to correspond to the size of the tumour nodule; that is, the larger the nodule, the more numerous the vessels. Their walls were tremendously thickened chiefly by fibrous increase of the intimal layer.

From the microscopic appearance, the fat tissue appeared to predominate in many of the nodules. By staining with Sudan III, this was found to be true of the larger tumour nodules. Many of the smaller nodules contained very few fat cells, but were composed almost entirely of the smooth muscle tissue with a fibrous stroma. In almost every nodule where the fat cells predominated a mass of fatty tissue, quite apart from the fibrous tissue stroma and muscle cells, was found occupying its central portion. The fat cells were found in the periphery of the nodules and appeared to have a definite relation to the vascularity of the tumour mass.

CASE 2

W. A., male, aged 62 years. This case came to autopsy (October, 1927), following death from peritonitis, with no history pertaining to a kidney condition. The urine contained a small quantity of albumen but no other abnormal constituents. The left kidney weighed 175 grammes and measured 12 x 5 x 3 cm. A large number of yellow fatty nodules, measuring from 0.4 to 1.3 cm. in diameter were scattered over the surface, particularly toward the upper pole. They were slightly raised above the surrounding kidney substance and had a lobulated appearance. On section a large number of these nodules were found scattered throughout the cortex. One larger mass, measuring 3 cm. in diameter, occupied the entire upper pole. This nodule was very soft and fatty and projected into the pelvis of the kidney, extending well down into the ureteral orifice.

The right kidney weighed 180 grammes and measured 11.5 x 5 x 3 cm. There were a number of small cysts measuring from 0.1 to 0.4 cm. in diameter, scattered over the surface. Numerous grayish-yellow nodules, similar to those observed in the left kidney, and varying from 0.1 to 1.2 cm. in diameter, were present. They projected above the surface, and, on section, were found to be distributed throughout both cortex and medulla. They were similar to those observed in the left kidney, and, as in the other kidney, were limited to the upper half of the organ.

The microscopic sections were stained with hæmatoxylin and eosin, by Van Gieson's method, and with Sudan III. The predominant cells in most of the smaller tumour nodules were the smooth-muscle cells. They were observed in longitudinal and cross section in all parts of the tumour. They appeared as both long and short spindle-shaped cells; their nuclei were quite large, vesicular, and ovoid in shape.

A cell of fibrous-tissue type which also was spindle-shaped and had a very deeply staining nucleus was observed to be next in frequency. These cells were intimately associated in the tumour nodules with the cells of the smooth-muscle variety, intertwining with them throughout.

As in the first case described, the presence of large blood vessels in association with these tumour nodules was most striking. They were found about the periphery of the tumour nodules and in many cases had an appearance suggestive of a small hæmangioma. The vessels were very thick-walled, due to a fibrous thickening which involved the intima and media alike. These vessels were frequently surrounded by the smooth-muscle cells in a laminated fashion.

The distribution of the fat cells in this case was not unlike that in the first one. Many of the nodules were composed chiefly of fat cells which varied greatly in size. These masses were found to have fibro-myomatous bundles, and frequently large blood vessels were found through the mass of fatty tissue. In those tumour masses where few fat cells were found, they occupied the periphery of the nodule and were found chiefly in proximity to the large blood vessels.

The occurrence of heterogenous tumours in the kidney is by no means an infrequent finding While the great majority of them are fairly typical and easily classified, there have been a few which, by virtue of the variety of their constituents as fat, smooth muscle, fibrous tissue, dilated blood channels, and cells resembling adrenal cortex, have been difficult to classify.

No attempt will be made to give a complete analysis of the extensive literature on this subject. A brief résumé however of some of the most interesting cases may prove of value in the consideration of the reports here presented.

Virchow classified these tumours in a general way as lipoma or fibro-lipoma. Grawitz[1] in 1883, made the important contribution that many of these so-called lipomata were in reality misplaced adrenal tissue, hence his terminology "struma suprarenalis aberrans." These tumours have since been known by the

more convenient name of hypernephroma, (Birch-Hirschfeld). Owing to their gross fatty appearance, they have been erroneously spoken of as lipoma. It is well known to modern pathologists that this type of tumour presents numerous variations in microscopic appearance, and in malignant and degenerative changes. It was inevitable that such extraordinary growths, presenting so many variations, should be easily confused with others whose structures resemble them in much detail.

Ewing[2] reports small multiple lipomata occurring beneath the capsule, or replacing a portion of cortex, and reaching to the medulla. Borst and Selter have described symmetrical lipomata, chiefly of the upper half of the organ. Some authors claim that true lipomata never reach a size greater than 1 cm. in diameter. Selter[3] in a very comprehensive review of the literature, claimed that the larger ones were in reality examples of replacement lipomatosis arising from the fat about the pelvis of the kidney. Beneke[4] claims that these lipomata grow by fatty infiltration of the renal connective-tissue, with simultaneous necrosis of the parenchyma and glomeruli.

In four cases previously reported these tumours attained unusual dimensions, (Alsberg, Grawitz, Warthin,[5] and Bartsch). Grawitz described his as a rarity of the first order. It measured 23 x 19 x 12 cm. and weighed 2,250 grammes. It was not an infiltrating growth and had a fibrous capsule about it. Warthin's specimen, a very large one, measuring 35 x 24 x 15 cm. and weighing about 5,000 grammes possessed no well marked capsule. It invaded the kidney causing atrophy, and extended into the pelvis and down the ureter. The tumour from Bartsch's case measured 25 x 19 x 12 cm. and weighed 2,250 grammes. These three cases had points in common, in that all contained smooth-muscle fibres, fibrous connective-tissue, and numerous large blood vessels, as well as pure adipose tissue. The predominance of fat led to their classification under lipoma. Alsberg's case is of particular interest, in that it resembles the first case reported in this paper. It was the size of a large grape-fruit, and there were numerous large yellowish sharply demarcated nodules of varying size scattered throughout the kidney substance. Some of these tumours became dislodged on section. It had a similar microscopic appearance, including the dense aggregations of fibroblasts resembling a spindle-cell sarcoma. There was, however, this one point of difference, that Alsberg's tumour contained a small nodule of adrenal tissue, none of which was found in our case.

In 1907, Archibald and Keenan[7] reported a case in which the tumour measured 9.5 x 8.5 x 5.7 cm. and weighed 350 grammes including the affected kidney. The tumour proper was 4.7 cm. in diameter. It occupied the centre of the convexity of the kidney, and appeared to divide it both longitudinally and transversely. It was well demarcated from the remaining kidney, but had no capsule. Microscopically, it was composed of fat cells, and large polyhedral cells with granular cytoplasm, and large oval nuclei. Some of the nuclei showed mitoses. They classified this tumour as a hypernephroma, believing that it showed a metamorphosis of adrenal cells into true fat.

Mueller[8] reported a tumour half of which was composed of fat cells and the other half of adrenal tissue. There was a decided division between the two types of tissue. Cases of mixed tumours, containing fat, muscle, and fibrous-tissue cells, have also been described by Mueller, and Manasse.[9] Ulrich[10] described five cases in none of which was the tumour larger than 1 cm. in diameter. He concluded that they were nothing more than fat occurring as a substitution product, replacing destroyed kidney epithelium, and forming, by confluence, large and small fat nodules.

Tumours of this class, occurring in connection with the kidney, which have been reported previously, appear to fall into four main groups: (1) the true hypernephroma; (2) the true lipoma; (3) a combination of lipoma and hypernephroma; and (4) the mixed fibro-lipomyomata, with or without tendency to sarcomatous characteristics.

The tumours in our own two cases resemble each other to a very marked degree in microscopic appearance, yet in the gross they are quite different: one reaching immense proportions, involving the kidney to such an extent as to interfere greatly with its function. This tumour occurred along with another tumour of similar character lying outside the kidney structure. There was no continuity between the two masses. In the other case, multiple small

tumours occurred in both kidneys, chiefly in the upper half of each. They caused no alteration in kidney function, nor did they produce any subjective symptoms.

That the tumours in both cases arose from similar tissues is borne out by the microscopic analysis, so that little argument in support of this point is needed. Their distribution in different retroperitoneal regions of the upper quadrants, and their limitation to the upper half of each kidney as in our second case, must be of etiological significance.

The etiology of mixed tumours, regardless of the site of occurrence, still remains obscure. The theories advanced in connection with the mode of development of these types of tumours in the kidney have revolved chiefly about the origin of the fatty structure. The explanation of this lies in the fact that the fatty tissue is usually in greatest prominence, and the term lipoma was immediately applied to them. Virchow, Selter, Beneke, Alsberg, Warthin, and others called it a lipomatous infiltration. Virchow says "the fat is heteroplastic", there being a proliferation of connective tissue, which subsequently changes into a fatty nodule by the newly formed cells taking up fat into their structure. Ulrich thought it was due to fatty degeneration of small areas of kidney epithelium which had suffered from toxic influence, and that the fat cells were formed by the confluence of the larger fat globules, "replacement lipomatosis". Archibald, however, claimed that there was a metamorphosis of adrenal cells into fat tissue from a pre-existing adrenal "rest" or hypernephroma. Mueller suggests that the fat arises in tumours having origin from misplaced fragments of the kidney capsule.

As to the origin of the fat in our own cases, the suggestion that it arises by replacement lipomatosis (Ulrich), or that it is a case of lipomatous infiltration (Virchow, Selter and others), is possible but not capable of proof. Archibald's claim that the adipose tissue arises by a metamorphosis of adrenal cells into fat cells does not have an immediate bearing upon the origin of mixed tumours as described. There is no evidence that these tumours have any relation to a hypernephroma or an adrenal "rest." From the microscopic analysis of the arrangement of the fat cells in the cases reported, it would appear that the occurrence of the fatty tissue is secondary to the beginning of the tumour, and that it was not a constituent of its structure from its onset. True, in both cases the great size attained by the tumours was due to the accumulation of the fatty tissue. The rapidity of growth of the tumour in the first case appeared to be due to the infiltration of fat. The fact that numerous tumour nodules were found without the presence of any fat cells, and that in those cases where fat occurred to a moderate or marked degree, it appeared to have developed in close relation to the large blood vessels and in the periphery of the tumour nodule, would lead one to believe that it was an infiltration, or a "replacement lipomatosis," produced by the activity of adipogenic tissues. Ewing expresses the belief that a congenital predisposition seems to be an essential factor in the origin of most lipomata, and that this condition is related to the distribution of blood vessels in the affected tissues. He agrees with Mueller that a more definite embryonic disturbance is probably responsible for the origin of lipomata of the kidney, where misplaced portions of kidney capsule are held to give rise to these fatty tumours.

The most common sites for the occurrence of the combined myxomata and lipomata are in the retroperitoneal regions, in the hilus of the left kidney, and in the spermatic cord, where local malignant myxo-lipomata are encountered. Robertson, in an analysis of 51 cases of lipoma-myxomatodes, found that 43 per cent developed in the muscles of the lower extremities, and 33 per cent in the retroperitoneal region, one of which attained a weight of 65 lbs. The occurrence of such-like multiple small tumours in the upper half of both kidneys is difficult to explain as the result of any acquired disease.

On the other hand, the complex embryological development of the excretory system from the mesoderm lends itself to suspicion. That the upper half of the kidney is more prone to be affected by embryological inclusions is supported by the fact that the most extensive degeneration and retraction of the upper five-sixths of the mesonephros takes place in the vicinity of the new forming upper half of the metanephros.

From the observations in these cases, and the evidence presented by other authors, one is inclined to the following conclusions:—

1. The tumours with which we are dealing

are of the nature of "mixed" tumours of the fibro-lipo-myomatous group. This conclusion is arrived at by the constant finding of fat, muscle, and fibrous tissue cells in all parts of the tumour masses.

2. Each of the multiple tumours within the kidney appears to have an independent origin, though the structure at times suggests a sarcomatous character.

3. These tumours arise as aberrant structures in mesoblastic tissues, and occur, not only within the kidney, but also in the retroperitoneal tissues.

4. The muscle elements of the tumour arise in part from the fibres of the vascular channels, no differentiation being possible between the muscle bundles of the tumour and the blood vessels.

5. The fat contained within the tumours is an associated development of a misplaced and functionless tissue. Pure lipomata of the kidney are infrequently found.

6. The symptoms produced are the result of pressure on other organs, due to the great increase in dimensions of the tumour.

In conclusion, I wish to thank Dr. F. N. G. Starr for permission to report his case, and Professor Oskar Klotz for his kind assistance, interest, and encouragement.

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TYPES OF RENAL DISEASE AND CERTAIN THERAPEUTIC SUGGESTIONS*

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DISEASE of obscure etiology has been considered from two viewpoints, that of Bright, who studied each individual case, making accurate clinical and pathological examinations and applying the newer scientific methods, and that of the sceptic who deprecates all pathological and clinical studies if the etiology is unknown. The etiology of many forms of renal disease is still an unsolved problem, and advances in this field of disease must be based on Bright's methods. For the last seven years, I have endeavoured to group our cases, with the result, I believe, that diagnosis, prognosis, and treatment have become more accurate.

Since 1914, Volhard and Fahr's classification of nephritis has been generally accepted as the most comprehensive. In recent years, further experience has necessitated certain changes and additions. For example, instead of scarlatinal nephritis being the classical type of acute glomerulonephritis, "war-nephritis," or "trench-nephritis," is now accepted as the best understood example of acute glomerulonephritis; also, in my experience, the most common form of acute nephritis occurring in pregnancy is of this type. Under the heading of acute renal insufficiency, I have included several conditions with similar clinical manifestations and disturbances of renal function, but for which as yet no common anatomical basis has been demonstrated. There has been much discussion over the term "chronic nephrosis." This type, which was first described by Müller, is not common, although cases are sometimes overlooked. In our group of chronic diffuse nephritis, nephrosis-like manifestations predominate at times, while at other stages cardiovascular phenomena are present. These cases are closely allied to those falling under the old term "chronic parenchymatous nephritis." Cases of chronic bilateral pyelonephritis should also be given due prominence, because they

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occur so frequently. There may be good general health and no cardiovascular abnormalities, despite marked bilateral renal lesions.

Chronic sclerotic lesions of the larger arteries can undoubtedly lead to a diffuse renal lesion and decreased function. In such cases the lesion may progress slowly, and chronic renal insufficiency be compatible with relatively good general health. Secondary anæmia, of serious import, in chronic glomerulonephritis, may be present for a long time before terminal symptoms develop. On the other hand, chronic glomerulonephritis is usually a steadily progressive disease, which soon results in chronic invalidism.

In contrast to these groups, general diffuse arterial disease and hypertension may or may not finally give rise to renal insufficiency. Allbutt and others have pointed out that diffuse vascular disease and hypertension may exist for many years without serious renal involvement. Keith and Wagener have shown that the malignant form of hypertensive disease of the arterioles can occur with adequate renal function, whereas Volhard and Fahr asserted that, in malignant hypertension, terminal renal insufficiency was the rule. In Table I are enumerated the chief types of bilateral renal disease, while Table II shows the differential data characteristic of each type.

TABLE I.

DISTINCT TYPES OF RENAL AND HYPERTENSIVE CARDIOVASCULAR DISEASE

Acute glomerulonephritis
- Scarlatinal nephritis
- Trench (or war) nephritis
- Acute nephritis of pregnancy
- Following certain acute infections

Acute renal insufficiency
- Acute tubular degeneration, for example, bichloride poisoning
- Postoperative
- Acute pyelonephritis
- Toxic hepatic lesion
- Duodenal obstruction

Chronic nephrosis

Chronic diffuse nephritis
- Chronic parenchymatous nephritis

Chronic pyelonephritis
- Associated with prostatic obstruction
- Bilateral nephrolithiasis
- Bilateral tuberculous kidneys

Chronic renal arteriosclerosis

Chronic glomerulonephritis

Malignant hypertension with renal insufficiency, malignant sclerosis of Volhard and Fahr

Malignant hypertension, adequate renal function

Benign hypertension

TABLE II.

MANIFESTATIONS OF DIFFERENT TYPES OF RENAL AND CARDIOVASCULAR HYPERTENSIVE DISEASES

	Œdema	Dehydration	Anæmia	Hypertension	Cardiac enlargement	Retinal changes	Convulsions	Oliguria	Polyuria	Albuminuria	Casts	Erythrocytes	Leukocytes	Renal function: Urea retention	Renal function: Phenolsulphone-phthalein retention	Renal function: Sodium chloride retention	Renal function: Water retention
Acute glomerulonephritis	+			+		±	+	+		+	+	+		±	±	+	+
Acute renal insufficiency								+		+	+			+	+	±	±
Chronic nephrosis	+							+		+						+	+
Chronic diffuse nephritis	+		±	±	±	±		+		+	+	±		±	±	+	+
Chronic pyelonephritis		+	+						+	+			+	+	+		
Chronic renal arteriosclerosis		+	+	+	+				+	+	+			+	+		
Chronic glomerulonephritis		+	+	+	+	+	+		+	+	+			+	+		
Malignant hypertension with renal insufficiency		+	+	+	+	+	+		+	+	+			+	+		
Malignant hypertension				+	+	+	+			+	+						
Benign hypertension				+	+					±	±						

TYPES OF CASES

Acute glomerulonephritis.—The chief features are: œdema, sometimes general anasarca; hypertension; occasionally retinitis with œdema of the retina; oliguria, and, in the urine, albumin, casts, renal epithelial cells, leukocytes and gross or microscopic blood. Renal epithelial cells, containing blood-pigment granules, are often present in the urine. The concentration of blood-urea or nonprotein-nitrogen is usually slightly raised, and the phenolsulphonepthalein excretion slightly reduced, although the excretion of these substances may be normal. Uræmic or psychomotor symptoms may occur, and are not necessarily of serious import. Acute renal insufficiency occurs in the rapidly progressive case as indicated by anuria and marked retention of urea. Death occurred in the acute stage of war-nephritis in approximately 3 per cent of the cases. Early diuresis, with disappearance of the œdema and hypertension, precede any marked change in the urinary constituents. Within three months the urine may be normal. Tables III and IV give the data in a case of

TABLE III.

ACUTE GLOMERULONEPHRITIS (WAR NEPHRITIS): MAN, AGED TWENTY.

Date	Days of disease	Temperature	Œdema, grade	Blood-pressure		Alveolar carbondioxide, tension mm., Hg.	Blood nonprotein nitrogen, (mg.) per cent	Urine					Comment
				Systolic	Diastolic			Volume, c.c.	Albumin, grade	Casts, grade	Erythrocytes, grade	Phenolsulphonepthalein, per cent	
4-23-17	5	99	3	165	110	25	47	320	3	2	1	62	Hydrothorax
4-24-17	6	99.4						2220	2		0		Œdema of optic nerve
4-25-17	7	Normal		140	90			2425	2		0		
4-26-17	8	Normal	2					2765	1		1		
4-27-17	9	99.2						2445	1		1		
4-28-17	10	Normal						2295	1		1		
4-29-17	11	Normal	tr.	100	65		43	1550	1		0		
5-16-17	28	Normal	0	100	65	38	29	1460	1	1–	1–	75	
7-16-17	90		0						0				Duration of illness three months.
10-26-17													Dismissed from hospital.
6-10-18													Posted for duty, B.E.F.

TABLE IV.

ACUTE GLOMERULONEPHRITIS OF PREGNANCY: CASE 1, WOMAN, AGED TWENTY-EIGHT

Date	Days of disease	Œdema, grade	Blood-pressure		Blood		Urine				Comment
			Systolic	Diastolic	Urea, mg. per cent	Creatinine, mg. per cent	Albumin, grade	Casts, grade	Erythrocytes, grade	Phenolsulphonepthalein, per cent	
7-29-24	30	3	200	120	71	1.3	3	4	1	40	Retinitis
8-3-24	35	0	175	120							Premature delivery at seven months
8-14-24	46	0	130	90							
8-25-24	57	0	120	80			tr.				
10-20-24	112	0	140	95			1			60	
7-6-25	3'0	0	120	80	17	1.3	0				Nothing abnormal found one year after onset
10-21-26	840	0	125	70	13	1.3	0			85	

XUM

waf-nephritis and in one of nephritis of pregnancy. The anatomical changes indicate diffuse nephritis, but the glomerular inflammatory changes are most marked and constant.

Acute renal insufficiency.—Oliguria or anuria is often the initial symptom. The abnormal elements in the urine may be insignificant or present in moderate degree; they include albumin,

TABLE V.

ACUTE POISONING BY BICHLORIDE OF MERCURY: WOMAN, AGED TWENTY*

Date	Days of disease	Temperature	Blood-pressure		Alveolar carbondioxide, tension mm., Hg.	Blood		Urine				Comment
			Systolic	Diastolic		Hemoglobin, per cent	Urea, mg. per cent	Volume, c.c.	Specific gravity	Albumin, grade	Phenolsulphone-phthalein, per cent	
9-21-15	2	100	105	85		95		0				Daily fluid intake 2500 c.c.
9-22-15	3						119	0				
9-25-15	6				27			0				
9-27-15	8						289	110	1.008	3	0	Anuria six days
10- 2-15	13				39		222	2240		1	11	
10- 8-15	19						24	2120		tr.	35	
10-13-15	24						17	430	1.012	tr.	45	
10-17-15	28							930	1.010	0		Acute renal insufficiency for one month, dismissed "well."

*Case reported by Lewis and Rivers, 1916.

TABLE VI.

ACUTE RENAL INSUFFICIENCY FOLLOWING RIGHT NEPHRECTOMY: CASE 2, MAN, AGED TWENTY-TWO.

Date	Temperatur	Blood-pressure		Blood				Urine							Comment
		Systolic	Diastolic	Hemoglobin (Dare), per cent	Urea, mg. per cent	Creatinine, mg. per cent	Carbon dioxide combining power, per cent by volume	Volume, twenty-four hours	Specific gravity	Albumin, grade	Casts, grade	Erythrocytes, grade	Leukocytes, grade	Phenolsulphone-phthalein, per cent	
Preoperative	99.6	134	100	87				750		2	0	1	3	50	Tuberculosis right kidney
Postoperative: First day	98.0							0							
Second day	101.0							100							
Fourth day	101.5	145	95		212	12.0		210	1.007						
Fifth day	98.6							640		2		1	2		
Sixth day	98.6				274	13.5		1250							
Tenth day					252	12.0									
Fourteenth day					187	6.4	59.0	1900	1.010	1		1	2	30	
Twenty-second day	98.6	115	80	90*	29	2.2		2500		1		1	1	50	Acute renal insufficiency for three weeks
One year later		140	95	79						3	0	3	3	45	Condition good; no vomiting; fluid intake from 2500 to 3000 c.c.

*Haldane carbon monoxide method.

TABLE VII.

CHRONIC NEPHROSIS: CASE 3, WOMAN, AGED TWENTY-ONE.

Date	Weight, kg.	Blood-pressure		Œdema, grade	Blood								Urine		Comment
		Systolic	Diastolic		Erythrocytes	Hæmoglobin (acid hæmatin) per cent	Hæmoglobin (Dare), per cent	Urea, mg. per cent	Creatinine, mg. per cent	Serum protein, gm. per cent	Cholesterol, mg. per cent	Lecithin, mg. per cent	Albumin, grade	Phenolsulphonephthalein, per cent	
2-21-24	78	120	80	3	4,970,000	107	85	16	1.2				3		Low-salt, low-fluid diet; calcium chloride, 40 gm.
3- 1-24	69			1	5,090,000		85						3	75	
9-27-24	76	104	80	2–3	4,840,000	100	77	14	1.5				2–3	75	Ammonium chloride, 55 gm.
10- 1-24											352	800*			
10-10-24	64	110	75	2		102		20	1.4				2		
3- 7-25	80	116	60	3	4,330,000		79	19	1.5				2–3	85	Ammonium chloride, 290 gm.; merbaphen, ten injections.
4-13-25											333	142†			
4-18-25	64	106	95	0			76	25					3		
6- 5-25	71	100	80	1	3,600,000	86	69	21	1.2				2	70	Ammonium chloride, 23 gm.
6-10-25	67														Merbaphen, two injections.
3-11-26	64	90	75	0	4,410,000	97	76	34		6.5	97	49†	3	50	Ammonium chloride, 5 gm. daily; merbaphen forty-one injections.
2-27-27	61	95	70	0	4,690,000		75	25		5.6	108	49†	4‡		Ammonium chloride, 5 gm. daily; merbaphen, twenty-one injections.
1-12-28	61	105	75	0	4,200,000		71	26					4	40	Ammonium chloride, 5 gm. daily; merbaphen, ten injections (total, 84 injections); duration of illness, eleven years; under observation for four years; good health and practically œdema-free for two years.

*Bloor method (normal values from 200 to 300 mg. per cent).

†Whitehorn method (normal values from 80 to 120 mg. per cent).

‡Doubly refractile lipoid bodies present.

TABLE VIII.

CHRONIC DIFFUSE NEPHRITIS: CASE 4, MAN, AGED THIRTY-ONE.

Date	Weight, kg.	Blood-pressure		Œdema, grade	Blood				Urine		Comment
		Systolic	Diastolic		Erythrocytes	Hæmoglobin (Dare), per cent	Urea, mg. per cent	Creatinine, mg. per cent	Albumin, grade	Phenolsulphonephthalein, per cent	
5-10-26	72	120	80	3–4	4,580,000	70	37	1.4	2	60	Low-salt, low-fluid diet. Ammonium chloride, 352 gm. Merbaphen, nine injections.
6-19-26							15				
7-16-26	51	140	100	0			65		1		
10-18-26	61	140	80	trace	3,100,000	70	52	3.7	2	30	Low-salt, low-fluid diet.
		150	85								
10-23-26	62	145	80	trace			20	2.3	2	30	
3- 4-27	60	210	140	trace	2,250,000	48	221	11.0	1	5	850 c.c. 10 per cent glucose and 5 per cent sodium bicarbonate intravenously. Coma; general convulsions; died; necropsy. Duration of illness, fifteen months.
3- 5-27											
3- 7-27		180	95				246	16.4	3		

cylindroids, epithelial cells, erythrocytes, and leukocytes. There is retention of urea and phenolsulphonephthalein and, if the condition persists, retention of creatinine. Œdema rarely occurs and hypertension is absent. These findings are similar to those following removal of both kidneys. Uræmic phenomena, such as nausea or vomiting, may be absent. Normal renal excretion of urea and phenolsulphonephthalein may be restored within two to three weeks: Such a clinical picture occurs: in poisoning by certain inorganic salts, for example, bichloride of mercury (Table V); in toxæmia occurring in high intestinal obstruction; in the toxæmia of acute hepatic insufficiency; following major surgical operations, for example, nephrectomy (Table VI); and in removal of malignant growths from the large bowel. If the renal insufficiency is of short duration anatomic evidence of renal disease may be absent or slight. In cases of longer duration, marked tubular degeneration may occur; this is particularly noticeable in bichloride poisoning, and to a lesser degree in the toxæmia of high intestinal obstruction.

Chronic nephrosis.—There is general œdema with no demonstrable diffuse vascular involvement in these cases. The urine contains a moderate to marked amount of albumin, with few casts or blood cells, and doubly refractile, so-called lipoid, bodies. Renal insufficiency is manifested only in the excretion of water and salts. The excretion of urea, creatinine, and phenolsulphonephthalein are typically normal. Anæmia is usually absent (Table VII). Specific chemical changes in the blood often occur. These include an increase in the concentration of the fatty constituents, such as cholesterol, lecithin, and total fats; a decrease in the protein-concentration of the serum; and a change in the albumin-globulin ratio. The lowered serum protein content is associated with a decrease in osmotic pressure. The pathological changes in the kidney are chiefly degenerative phenomena, most noticeable in the tubules. Doubly refractile bodies can often be demonstrated in the renal parenchyma. Grossly, the kidneys are large, firm and pale, and suggest fatty degeneration.

Chronic diffuse nephritis.—These cases often resemble those of chronic nephrosis, but sooner or later definite diffuse vascular changes occur. The transition from chronic nephrosis to diffuse nephritis is characterized clinically by the reduction or subsidence of the œdema and the appearance of hypertension, retinitis, and anæmia, and the retention of urea, creatinine and phenolsulphonephthalein (Table VIII). The older term "chronic parenchymatous nephritis" is applicable to these cases. Histological study shows a chronic diffuse lesion; though all the structures of the kidney may be involved, the most outstanding changes occur in the renal parenchyma.

Chronic bilateral pyelonephritis.—This condition is the best example of chronic renal insufficiency due to a renal lesion alone. It is usually caused by obstruction of the urinary tract with a secondary infection, and especially by benign hypertrophy of the prostate with urethral obstruction. The urine shows polyuria,

TABLE IX.

CHRONIC BILATERAL PYELONEPHRITIS: MAN, AGED SIXTY-TWO.

Date	Blood-pressure		Œdema, grade	Dehydration, grade	Blood				Urine			Comment
	Systolic	Diastolic			Hæmoglobin (carbon monoxide method), gm. per cent	Erythrocytes	Nonprotein nitrogen, mg. per cent	Creatinine, mg. per cent	Albumin, grade	Leukocytes, grade	Phenolsulphone-phthalein, per cent	
9-25-17										2		Temperature as high as 103°.
7- 4-18	120	75								2–3		Nephrotomy.
4-15-20	120	75	0	2	10.5	3,500,000	71		1	2–3	10	Specific gravity ranged from 1.007 to 1.011
4- 5-21			0	2			132	4.1	1	2–3		Prostatic hypertrophy; acute retention, cystostomy, asthenic uræmia. Duration of illness, four years.
5-29-21												Death; necropsy.

low and fixed specific gravity, albuminuria, pyuria, and bacilluria. Functional studies show retention of urea, creatinine and phenolsulphonephthalein. Œdema, hypertension, cardiac enlargement and changes in the fundi are, as a rule, absent. In the late stages anæmia, dehydration, and asthenic uræmia develop. The renal structures are infiltrated by polymorphonuclear leukocytes; later the renal tissue is markedly reduced and replaced by fibrous tissue; often the kidneys are reduced to mere fibrous-tissue capsules. In many of these cases comparatively good health may be enjoyed for several years (Table IX).

Chronic renal arteriosclerosis.—Cases of this type, with lesions of the larger renal arteries, usually progress more slowly than cases of chronic glomerulonephritis. The disease is manifested clinically by moderate peripheral arteriosclerosis; hypertension; often secondary anæmia; changes in the retinal arteries; and definite retardation in the excretion of urea, creatinine, and phenosulphonephthalein. The concentration of the urine is diminished, and there is usually a polyuria. Albuminuria of varying degree is present, and at times there are hyaline and granular casts. Œdema is rare, unless the hypertension has provoked mild myocardial insufficiency. Barker has shown, by injecting the arteries of the kidneys of this type, that, in spite of the arterial lesions, numerous glomeruli may retain their structure. The usual histological picture is that of a patchy renal fibrosis. The prognosis in several cases in this group was similar to that of chronic pyelonephritis; namely, a comparatively comfortable, useful existence for several years (Table X).

Chronic glomerulonephritis. — Progressively diminishing renal function, combined with marked cardiovascular disease, is characteristic of this type. The onset usually occurs before the age of forty. The clinical picture shows hypertension; typical retinitis; and secondary anæmia, which may become severe. There is retention of urea, creatinine, and phenolsulphonephthalein. Œdema is uncommon, except when secondary to myocardial failure. Polyuria is present and the urine is of low and fixed specific gravity; variable amounts of albumin, sometimes a mere trace, and, periodically, hyaline and granular casts are found. Dehydration may result from loss of fluid, caused by the polyuria and decreased fluid intake. The course of the disease is progressively downward, the anæmia usually increasing in proportion to the renal insufficiency (Table XI). The patient may live for several years, but during this time is a chronic invalid. Thus the immediate cause of death is renal insufficiency, cardiac failure or cerebral vascular accident. Anatomically, the kidney presents a diffuse lesion with widespread glomerular injury.

Malignant hypertension with renal insufficiency.—In contrast to the types previously described, in which the renal lesion and abnormal renal function play the major role (with the exception of nephrosis), the primary abnor-

TABLE X.

CHRONIC RENAL ARTERIOSCLEROSIS: CASE 5, MAN, AGED FIFTY-FIVE.

Date	Blood-pressure		Œdema	Blood				Urine			Comment
	Systolic	Diastolic		Hæmoglobin (Dare), per cent	Erythrocytes	Urea, mg. per cent	Creatinine, mg. per cent	Albumin, grade	Leukocytes, grade	Phenolsulphonephthalein, per cent	
7- 7-22	200	110	0	74	5,200,000	52		3	1	20	No evidence of prostatic obstruction; peripheral arteriosclerosis, graded 3.
7-12-22	145	110				65	2.3			15	
7-30-22	160	110				37	2.2				Retinitis.
7-16-23	170	110	0	78	4,700,000	46	2.2	3		30	No active retinitis.
2-21-24	160	100						2	0		
6- 9-27											Condition has remained good for five years.

mality is hypertension and diffuse vascular disease, which may finally seriously involve the kidney as well as many other vital organs. When this stage is reached, the term "malignant hypertension," first used by Volhard and Fahr, is applied to this disease. The condition of the urine and the status of renal function are essentially the same as in chronic glomerulonephritis. Keith and Wagener have further shown that malignant hypertension may exist

TABLE XI.

CHRONIC GLOMERULONEPHRITIS: CASE 6, MAN, AGED EIGHTEEN.

Date	Duration of disease, months	Œdema, grade	Blood-pressure		Blood				Urine				Comment
			Systolic	Diastolic	Hæmoglobin (Dare), per cent	Erythrocytes	Urea, mg. per cent	Creatinine, mg. per cent	Albumin, grade	Casts, grade	Erythrocytes, grade	Phenolsulphonephthalein, per cent	
1-25-15	2	4							2	3	2	25–50	
2-27-15	3	0										35	No retinitis
2-14-16	15	2			78		54		1	3	2		
2-28-16		0	120	80			46		2	2	1	31	
6-30-18	40	2	140	95					1	1			
5-24-20	66		185	110					1	1			
11- 8-20	72	trace	190	140	42	2,340,000	124	4.0	3	2	2	10	One retinal hæmorrhage.
12- 9-20		0	150	105			126	10.7	2	1	1		Tonsillectomy.
12-13-20		0			40		177	15.8					
1-14-21			145	70	44		111	10.5	2	1	1		
8-30-21					42		170	7.1					
3-29-22	84				37	2,100,000	228	13.0					Pericarditis. Duration of illness, seven and five-tenths years, during most of which time disability was marked.
6-13-22	90												Death.

TABLE XII.

MALIGNANT HYPERTENSION WITH ULTIMATE RENAL IMPAIRMENT: CASE 7, WOMAN, AGED FIFTY-FOUR.

Date	Blood-pressure				Pulse rate on admission	Size of heart, grade	Peripheral sclerosis, grade	Retina	Urine		Renal function		Comment
	On admission		Minimum under treatment						Albumin, grade	Casts, grade	Blood urea, mg. per cent	Phenolsulphonephthalein, per cent	
	Systolic	Diastolic	Systolic	Diastolic									
12- 6-23	210	160	150	90	85	3	1	Neuroretinal œdema; hæmorrhages and exudates. Sclerosis graded 2	1–2	1	33	40	Renal function adequate.
9-14-24	260	140	245	150	80	3–4	2	No change.	2–3	1	91–134		Renal function definitely insufficient.
9-19-24													Patient died 9.5 months from date of diagnosis. Cause of death, simultaneous cerebral, cardiac and renal failure.

with but little prejudice to renal function, and have stressed the retinal picture as an indication of the seriousness of the diffuse disease of the arterioles (Table XII). In still greater contrast is the clinical syndrome described by Allbutt, Janeway, and others, in which hypertension and diffuse vascular disease, including marked cardiac hypertrophy, may exist for years with adequate cardiac and renal function and good general health. The progress of this benign type of hypertensive cardiovascular disease is very slow, and many patients reach the allotted span of three score years and ten. Mahomed, in 1881, aptly termed such cases "Bright's disease without albuminuria" (Table XIII).

DISCUSSION OF TYPES

In acute renal insufficiency the kidney as a whole begins to fail and may cease to function, oliguria or anuria being the sequel. In acute glomerulonephritis, hypertension and œdema are found in addition to renal insufficiency. In chronic nephrosis, retention of salts and water predominate. Chronic bilateral pyelonephritis affords the simplest example of chronic renal insufficiency; polyuria is present, but retention of urea and phenosulphonephthalein occurs, and anæmia may also develop. In chronic glomerulonephritis, cardiovascular phenomena are present, as well as chronic renal failure. In the late stages of chronic glomerulonephritis, chronic arteriosclerotic kidney, and the nephritis of malignant hypertension, the status of renal function, the cardiovascular signs, and the degree of secondary anæmia may be similar; here the previous course usually affords a clue to the differential diagnosis. Finally, in benign hypertension cardiovascular signs predominate, and renal function continues to be adequate for many years.

In the description of these types of cases, I have emphasized the common and outstanding features of each group. That such typical cases occur cannot be disputed. Nevertheless, many are of a borderline or mixed type. Intensive study of the former should lead to further knowledge of the fundamental etiology, and thus to prevention and satisfactory methods of treatment.

PROGNOSIS

Bright, in his original contributions, emphasized the unfavourable course of the disease. Some of his contemporaries, including Barlow, found cases in which albuminuria was present without serious impairment of health. Bright recognized that recovery took place in certain cases, and gave the results of these observations in his last paper on the disease, written in 1840. He reported cure in five cases, and one case in which he knew the disease was arrested for six years. The patient was a tanner and carried on his work during this period. These facts have been forgotten by many, who think that there is no escape from nephritis once it is acquired, and that the course is rapidly downward. In the World War many soldiers were incapacitated for service by acute glomerulonephritis. I had the opportunity of studying

TABLE XIII.

BENIGN HYPERTENSION WITHOUT NOTABLE RENAL DISEASE: CASE 8, WOMAN, AGED FORTY-NINE.

Date of admission	Blood-pressure				Pulse rate	Cardiac enlargement, grade	Peripheral sclerosis, grade	Retina	Urine		Renal function	
	On admission		Minimum under treatment						Albumin, grade	Casts	Blood urea, mg. per cent	Phenolsulphone-phthalein, per cent
	Systolic	Diastolic	Systolic	Diastolic								
7-21-17	240	135			100				Trace	0		
10-16-23												
10-27-25	235	125			90	1	2	Moderate sclerosis; one hæmorrhagic area.	Trace	0		
12- 1-25	180	90	150	100	74			No hæmorrhages.	0	0	27	60
6-21-26	190	130	135	85	80	1	2	No change.	0	0	18	75
*11- 9-26	220	120			80	1	2	No change.	0	0		

*Rather marked hypertension observed for nine years; known of for ten years.

many of these cases at the Boulogne Base. After the acute stage a careful follow-up system was instituted, and it was found that in approximately 50 per cent of the favourable cases recovery was complete. Abercrombie obtained records of a series of 171 cases; in approximately 60 per cent of these, the soldier was returned to his base depot fit for duty, after a period of from two to three years. Dyke, in 1921, traced 100 of the cases which he had observed in France, and found that 70 per cent of the patients had completely recovered. Hume and Nattrass, from 1922 to 1925, observed a series of 281 cases, in 45 per cent of which there was no evidence of renal disease; in 45 per cent there was some evidence of disease; and in the remaining 10 per cent there was advanced chronic nephritis. Such statistics support the view that acute glomerulonephritis can be a self-limiting disease. During the last seven years at the Mayo Clinic thirteen cases have been recorded, in which all evidence of the disease has entirely disappeared (Table XIV). Besides these undoubtedly cured cases of acute glomerulonephritis, several arrested cases of a subacute or chronic form have been observed. One boy who contracted the disease at the age of seventeen, two and one-half years ago, appears to be in good health, although the urine contains albumin and casts. In another case, that of a

TABLE XIV.

CASES OF ACUTE NEPHRITIS IN WHICH CURE RESULTED.

Case	Age	Days of disease	Œdema, grade	Blood-pressure		Phenolsulphonephthalein, per cent	Blood urea, mg. per cent	Urine albumin-free, months after onset	Comment
				Systolic	Diastolic				
9	22	5	2	160	110	50	52		Tonsillectomy.
		15	?	135	85		34		
		37	0	130	80		22	14	
10	22	10	0	110	70		180		Oliguria;
		16		150	90				general convulsion;
		20		125	90		39	5	tonsillectomy.
11	63	10	1	170	100				
		11				40	82		
		39	0	125	70		23	20	Tonsillectomy.
12	26	14	2	180	105	55	32		
		25	trace	125	90	50	30	24	Normal delivery, thirty-second day.
1	28	32	2	200	120	40	71		Spontaneous delivery, thirty-fourth day,
		58	0	120	80				seven months' baby.
		365	0	120	70	60	17	12	
13	29	60	0	150	95	55	32		
		84	0	135	65			5	Tonsillectomy, seventy-third day.
14	25	57	0	150	85				
		68	0			50	26	20	Tonsillectomy, seventy-first day.
15	35	30	0	120	80	65	21	12	Tonsillectomy, twenty-first day.
16	16	26	trace			60	18		Drainage of right chest for empyæma,
		48		115	60				seventh day;
		201					106		second operation on chest, one hundred
		209					16	8	and ninety-seventh day.
17	20	12	2	110	65	50	57	4	No recurrence, six years.
18	29	60	1–2	160	65	55	78		Exophthalmic goitre;
		106	0	140	65				thyroidectomy;
		156		110	70	60	20		tonsillectomy;
		390	0	115	65	70	14	13	general condition, excellent.
19	35	60	1	175	90	60	45		Tonsillectomy;
		270	0	130	75	55	21	9	general condition, excellent.
20	18	21	trace	160	100	70	38	8	Tonsillectomy.

man aged thirty-two, there had been serious symptoms, such as general anasarca and hypertension for five months; he is now well and the only abnormality after two years is an occasional trace of albumin in the urine (Table XV). A third case, that of a woman aged twenty-one, is an example of arrested chronic nephrosis. She has been under observation for four years (Table VII); she is working steadily and, in spite of albuminuria, feels well.

In acute renal insufficiency it is well known that satisfactory recovery occurs in many cases. Numerous observers, including Lambert and Patterson, Lewis and Rivers, have reported recovery from acute poisoning by bichloride of mercury. Barrier and Keith reported recovery in cases of acute renal insufficiency following major surgical operations. In chronic pyelonephritis and renal arteriosclerosis the progress of the lesion may be slow, and the patient may live for several years in comparative comfort. On the other hand, in cases of chronic diffuse nephritis, and of chronic glomerulonephritis, marked disability is soon evident and the course is gradually downward, although life may be prolonged for months or several years (Table XI). In cases of malignant hypertension, with or without renal insufficiency, the prognosis is serious, death usually occurring within a year. It is generally recognized that benign hypertension may not shorten life or seriously impair health.

TREATMENT

Since 1917 several new remedies for the treatment of nephritic œdema have been employed. Schultz, a German medical officer, was the first to demonstrate the usefulness of an acid-producing salt in the treatment of œdema in nephritis. He showed that, in cases of œdema which had failed to respond to such diuretics as digitalis and caffein, the œdema could be abolished by the liberal use of the acid-producing salt, calcium chloride. This salt readily causes nausea and vomiting; in my experience, ammonium chloride and ammonium nitrate have been more satisfactory. Two years ago, we advised the combined use of an acid-producing salt and the organic mercury preparation, merbaphen. It was thus possible to bring about diuresis in stubborn cases. A low-salt, low-fluid, weighed diet was a most useful adjunct to the administration of the combined diuretics.* This treatment has been most efficacious in the œdema of nephrosis (Tables VII and XV). In cases of definite hæmaturia, or when the blood urea is as high as 75 mg., as in chronic diffuse nephritis, this treatment has not seemed justifiable. Bannick, of the Mayo Clinic, has lately found that in the latter cases, the caffein preparation, euphyllin, may be beneficial. Unless the blood-urea is extremely high, the œdema of nephritis can, in most cases, be controlled.

A second form of treatment that has been found useful in cases of acute and chronic renal

* The weighed diet employed contains approximately 1 grm. sodium chloride; it is also low in other salts. The actual fluid content of the food is 800 c.c., so that with an allowance of 800 c.c. of extra fluid the actual fluid intake is 1600 c.c. Ammonium chloride and ammonium nitrate are best taken in salol-coated pills or tablets, in doses of 6 to 10 grm. daily. Both merbaphen and salyrgan have been found satisfactory. An initial trial dose of 0.5 c.c. is given, to avoid serious reactions. The subsequent dose is from 1 to 2 c.c.

TABLE XV.

ARRESTED SUBACUTE GLOMERULONEPHRITIS: CASE 21, MAN, AGED THIRTY-TWO.

Date	Time, months since onset	Œdema, grade	Blood-pressure		Blood					Urine			Comment
			Systolic	Diastolic	Hæmoglobin (Dare), per cent	Erythrocytes	Urea, mg. per cent	Creatinine, mg. per cent	Cholesterol, mg. per cent	Albumin, grade	Casts, grade	Phenolsulphonephthalein, per cent	
10-26-25	5.5	4	165	120	45	3,200,000	66	1.5	286	3	4	25	Previously, abdominal paracentesis, eleven times; weight on admission, 84.4 kg.
1- 2-26	7.5	0	110	80	60	3,650,000	33	1.1	177	3	3		Weight, 57 kg.; loss, 27.4 kg.; ammonium chloride, 515 gm., salyrgan, sixteen injections; transfusion, 500 c.c.
6- 8-26	13	0	120	75	72	5,040,000	38	1.6	101	1	0	60	Weight, 70 kg.; appears healthy.
6-10-27	25	0	125	75	73	4,550,000	34	1.6		1	0	80	Appears healthy; no retinitis during illness.

TABLE XVI.

SUMMARY OF THREE CASES OF URÆMIA BEFORE AND AFTER INTRAVENOUS TREATMENT

Case	Age, years	Diagnosis	Treatment, days	Blood chemistry						Carbon dioxide combining power of plasma, per cent by volume		Erythrocytes, millions		Hæmoglobin (Dare), per cent		Phenolsulphonephthalein, per cent		Duration of life
				Urea, mg. per cent		Creatinine, mg. per cent		Plasma phosphates, mg. per cent										
				Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	
10	22	Acute glomerular nephritis with uræmia	24	240	26	11.0	1.7	9.8	4.3	46	57	3.86	3.49	63	62		70	Living and well, eight months.
22	29	Acute exacerbation of chronic glomerulonephritis with uræmia.	42	400	55	12.0	2.8	8.5	3.5	30	52	1.20	3.48	26	60		25	Living four months, working.
23	22	Chronic glomerulonephritis with uræmia	24	276	200	13.2	6.7			35	50	1.84	2.56	28	45	?*	10	Living, last report, five months.

*Very faint return.

insufficiency without œdema is water, liberally taken. It is well recognized that when vomiting and diarrhœa occur, water cannot be administered by mouth or rectum. It can then be given satisfactorily intravenously in the form of 10 per cent or 20 per cent glucose solution. As much as 2500 c.c. can be injected in this manner daily. It is often remarkable how a kidney which is in an anuric or oliguric state will respond to such injections, particularly when the renal insufficiency is acute. Asthenic uræmia and dehydration occurring in cases of chronic renal insufficiency are often greatly benefited by water by mouth or rectum, or as intravenous injections of glucose solution. This treatment has been carried out in chronic cases which seemed hopeless, and yet in a few days the patient has come out of coma and has been able to be up and about for as long as several months. In Table XVI are given some results of intravenous treatment, obtained by Bannick in three cases of uræmia. He found also that transfusions of whole blood have been beneficial in dehydration and uræmia when secondary anæmia has been marked.

COMMENT

From the study of individual cases, and the groups into which they naturally fall, much new knowledge has been derived concerning the prognosis and treatment of renal disease. Certain new remedies have rendered the treatment of œdema much more satisfactory. By the administration of water, by mouth or rectum, or in glucose solution by vein, dehydration and uræmic states can often be temporarily controlled. There are still many unsolved problems in renal disease, including the cause of the disease itself and the cause of hypertension, uræmia, and œdema. The fact that œdema can now be much more readily controlled leads one to hope that the other obscure factors may soon reveal their secrets.

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CAROTINÆMIA AND DIABETES*

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IN 1904 von Noorden[1] recorded the observation that some diabetics acquire a canary-yellowish discolouration of the skin. This discolouration was noted particularly in the naso-labial folds, on the palms of the hands and the soles of the feet. To this condition he gave the name "xanthosis diabetica." The serum of such individuals becomes intensely yellow. In 1913, van den Bergh and Snapper[2] showed that this discolouration had no relation to bilirubinæmia. It is due to excess quantities of materials grouped under the term lipochromes. In further investigations Bürger and Reinhart[3] found a parallelism between the degree of xanthosis and the lipochrome-content of blood.

At the present the consensus of opinion would appear to be that the chromogenic substance accumulating in the blood is due to the ingestion of large quantities of vegetable pigments. Thus, von Noorden found the condition particularly in children who were maintained on very high vegetable diets; van den Bergh found the pigment to be the same, spectroscopically, as the colouring matter of carrots, and later the same author found that wherever xanthosis was present an increase of the carotin content of the blood could be demonstrated; Salomon[4] noted that the pseudo-icterus of children, after ingestion of carrots, corresponded to the xanthosis described by von Noorden; Bürger found that chemical and spectroscopic tests of the lipochromes of xanthosis corresponded to the carotinoid group of pigments, which are closely associated with the chlorophyll of green plants. Hess and Myers,[5] Head and Johnson[6] and, more recently, Stoner[7] definitely attribute the xanthosis of diabetes to carotinæmia.

That this yellowish discolouration of the skin may be the result, or indicative, of some other condition does not appear, judging from the literature, to have received much consideration. The only references the writer could find were those of von Noorden,[1] Klose,[8] and Wells.[9] Von Noorden observed that when high vegetable diets are discontinued, the yellow colour disappears more rapidly in normal than in diabetic individuals. He noted that the condition was more marked in the severe diabetic, and suggested that there may be some metabolic disturbance to account for it. Klose advanced the idea that it might have some connection with fat metabolism, and Wells observed that the pigment may be partly endogenous from mobilization of tissue fat. The probable reason that so little attention has been given to this phase of diabetes is that in every case vegetable pigment was a prominently contributing factor and such pigments have been shown to be non-toxic, and lead to no physiological disturbance.[10]

By seeing a reasonably large group of people with the same disease, at fairly frequent intervals and over somewhat lengthy periods, one cannot help but gain impressions of new conditions which present themselves, and it suggested itself to the writer that there was something more to this yellowish skin than the interesting fact that it was allied to carotinæmia. The impression was that many of these patients were not doing well, either from the clinical or laboratory point of view. The number of those who required insulin appeared to be large. Cardiovascular disease seemed to be prominent. The incidence of hypercholesterolæmia, hyperglycæmia, raised renal thresholds, and insulin œdema appeared to be relatively large; and in those taking insulin, the reactions to it were poor. That xanthosis was the result of some condition other than the ingestion of large quantities of vegetables was very strongly suggested by a more careful investigation, in which it was found that some patients had the condition before they were subjected to any change of diet. For example, the most marked case in our records is that of a woman who, when she entered the hospital with gangrene of one of the lower extremities, learned, for the first time, that she had diabetes. Apropos of this, an interesting

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question is why do not vegetarians acquire yellow skins?

In order, however, to test the correctness of these impressions, it was considered advisable to make a more complete clinical and laboratory study of these cases. At once a difficulty was met with. Though very marked discolourations were readily detected, it was thought that slight discolourations might either be missed or other conditions might be mistaken for it. Anæmias and icterus were the chief of the latter group. These were readily ruled out by hæmoglobin determinations and van den Bergh estimations of the bilirubin-content of the blood.

In spite of these precautions some cases were met with in which there were differences of opinion as to the colour of the skin. In order, therefore, to make certain of the presence or absence of this condition, it was considered necessary to estimate directly the lipochrome content of the blood, particularly that of carotin. Through the efforts of Tswett,[11] and Willstätter and Mieg,[12] and, later, of Palmer *et al*,[13] who made a very extensive study of the pigments of biological materials, (milk, butter, eggs, agricultural products), methods for such a study are now available. Carotin can now readily be detected and estimated quantitatively. This depends upon three properties of this pigment, namely, its solubilities in alcohol and petroleum ether, its failure to be adsorbed onto calcium carbonate, and its spectroscopic bands.*

For routine purposes excess quantities of carotin in blood may readily be detected by a method based upon the following solubility properties of this and other pigments met with clinically. Hess and Myers, and also Stoner, employed this principle in their analyses. The latter does not, however, record the origin of his method.

To quote Palmer *et al*[13] verbatim: "It has been found that carotin cannot be extracted from its solution in low-boiling-point petroleum-ether by 80 to 90 per cent alcohol, while low-boiling-point petroleum-ether will quantitatively extract carotin from its solution in 80 to 90 per cent alcohol."

The observation that carotin can be removed from its solution in alcohol by petroleum-ether has an important bearing on the method used in this study. Much of the carotin in blood may be bound to the proteins, either chemically or physically (adsorption). In either case, the pigment is readily set free from the proteins by precipitating the latter with alcohol. Unfortunately, however, other blood-pigments frequently met with clinically, particularly those of bile, are also soluble in alcohol. These, or at least the greater part of them are, however, insoluble in low-boiling-point petroleum-ether. During the test they remain in the alcoholic fraction. For example, even with bloods from cases of marked jaundice, showing very intense van den Bergh reactions, none of the pigments responsible for the latter reaction are removed from the alcoholic fraction of the mixture by the petroleum-ether. Low-boiling-point petroleum-ether also fails to dissolve the pigments of hæmolyzed blood from the alcoholic fraction. The following tests readily demonstrate this phenomenon.

To 3 c.c. of plasma, containing large quantities of bilirubin or hæmolyzed blood, an amount of plaster-of-Paris is added, sufficient to bring the mixture to the consistency of a paste. To this is added 3 c.c. of 95 per cent ethyl alcohol. The mixture is shaken for a few minutes. When precipitation of the proteins is complete, 3 c.c. of petroleum-ether (B.P.30-50° C.) are added. The mixture is shaken for ten minutes and then centrifuged. It will be found that all of the bilirubin or hæmolyzed blood remains in the alcohol.

The layer of ether may acquire a very slight yellowish tinge. This, or the greater part of it, is vegetable pigment. (Practically all normal bloods contain minute traces of vegetable pigment. This will presently be referred to).

Now if this test be applied to a plasma containing carotin, this substance will be found to remain in the *upper* layer, that is, in the ether. This superficial liquid can then be removed and placed in a clean dry test tube for purposes of comparison with standard colours.

For quantitative work, a solution of oleic acid in petroleum-ether was used, and the results expressed in units. By the above method the max-

* A more complete report of chemical studies of limited clinical interest forms the subject matter of a separate communication. It will be shown that the lipochromes consist of pigments other than carotin, but the latter is invariably present in these cases of xanthosis. In view of this, the simple procedure described here suffices for routine clinical studies.

imum amount of pigment found in the blood of more than one hundred normal individuals gave a colour corresponding to 10 per cent solution of oleic acid in petroleum-ether. This is regarded as one unit of pigment. Diabetics may show discolourations corresponding to a 50 per cent solution of oleic acid or more. That is, they may have as much as five, or more, units of pigment. The great majority of diabetics have more pigment than the normal individual. Two to three units are not uncommon. This is apparently, however, not sufficient to discolour the skin.

In view of the above observations, the following routine procedure was adopted in this investigation:—

In each case the clinical data consisted of the age, sex, the duration of the diabetes, whether insulin was or was not required, whether the patient was or was not on any special diet prior to the tests, and whether there was any evidence of arteriosclerosis. The presence of the latter was judged by the usual data, hypertension, cardiac hypertrophy, thickening of the radial blood vessels, x-ray of the blood vessels of the lower extremities, and other direct evidence, such as gangrene, cerebral hæmorrhages, etc. The laboratory tests in each case consisted of blood-sugar, blood-cholesterol and hæmoglobin estimations, the van den Bergh reaction, and the above described test for carotin.

Discussion of Results

During the period of this investigation, one thousand and fourteen diabetics were seen in the clinic, but in only fifty-nine persons was there a suggestion of an excess of carotin. Since most of these patients were on diets of the same vegetable content,* it is obvious that it would be difficult to explain the condition of the skin as due solely to the ingestion of vegetable pigment.

Of the 59 patients who had excess pigment, 13 had never been on any special vegetable diets prior to these tests. As a matter of fact, eight of these never knew they had diabetes until some other condition led to their admission into the hospital, when glycosuria was first discovered.

There was nothing remarkable about the sex incidence: there were 26 males and 33 females.

All decades were represented, as the following table demonstrates:—

Age	*No.*
–20	3
21–30	6
31–40	8
41–50	20
51–60	5
61–70	13
71–80	4

The minimum age was 3 years, the maximum 76, and the average was 47.6 years.

Of these 59 patients, 44, an incidence of 74.5 per cent, required insulin. This is remarkable in view of the fact that only about 18 per cent of all our patients are receiving insulin. Of these 44 patients; in 11 instances hyperglycæmia was difficult to control; 6 had raised renal thresholds for sugar; and 4 had insulin-œdema.

Thirty-six patients, an incidence of 61 per cent, had some evidence of arteriosclerosis. In fact, 4 had gangrene of the extremities. This is a very large incidence of arteriosclerosis, since only 22 per cent of all our cases show this condition. Apropos of arteriosclerosis, it may here be mentioned that the average duration of the diabetes for the whole group was 3.1 years, a rather short duration for the onset of this condition.

The results of the cholesterol determinations are interesting. The prognostic significance of this substance is generally known. The data are shown in the following table:—

TABLE I

PLASMA-CHOLESTEROL DATA

Per Cent	*Incidence*
–0.200	16
0.201–0.250	10
0.251–0.300	17
0.301–0.350	4
0.351–0.400	5
0.401–0.450	4
0.451–0.500	2
0.501–	1

In the interpretation of these findings there are two important considerations. A large number of diabetics have diseases of the biliary passag s. This has been shown in other laboratories as well as in our own.[14] In this condition the cholesterol-content of the blood may be increased. As a matter of fact, the blood of eleven of these

* The principle of undernutrition is adhered to in this clinic wherever possible. Few of our diabetics receive more than fifty grammes of carbohydrates a day. The vegetables, for purposes of bulk, therefore, belong to the 5 per cent list.

patients gave positive van den Bergh reactions. This test, when positive, as is well known, is a reliable test of biliary disease in the absence of hæmolytic processes. The cholesterol values of such cases should obviously be excluded from this study. In the following table are shown their values and incidence:—

TABLE II

CHOLESTEROL DATA OF DIABETICS WITH EXCESS CAROTIN AND ALSO POSITIVE VAN DEN BERGH REACTIONS

Per Cent	*Incidence*
–0.200	4
0.251–0.300	4
0.301–0.350	2
0.451–0.500	1

These findings did not, however, affect the average results, as the following table shows. In fact, the highest cholesterol value was found in the absence of a van den Bergh reaction, namely, 0.560 per cent.

TABLE III

CHOLESTEROL VALUES

	Maximum	*Minimum*	*Average*
Whole group	0.560	0.153	0.271
Not including those with van den Bergh reactions	0.560	0.153	0.278

In connection with cholesterol, an interesting case presented itself, showing the limitations which may be attached to cholesterol determinations when patients have large amounts of vegetable pigments in their bloods.

The youngest subject (age 3) acquired a very high cholesterol content (0.454 per cent) very shortly (3 weeks) after the institution of a high vegetable diet. There appeared to be no other evidence indicating a bad prognosis. It is generally known that plants contain substances (sterols) allied to cholesterol. May this be the explanation of unexpectedly high cholesterol values in relatively mild diabetics who appear to be doing well? That this, however, does not wholly explain the above high cholesterol values is suggested from the fact that some of these patients had large quantities (5 to 6 units) of pigment, and at the same time the cholesterol values were either normal or nearly normal.

SUMMARY

The phenomenon of xanthosis was investigated in a group of one thousand and fourteen diabetics. Of these, 59 had the condition.

The majority of these patients were practically on the same diets, as to their vegetable contents. Since, in spite of this, the incidence of xanthosis was found low, it is suggested that there must be some factor, other than the diet, to account for this condition. Further, and strongly suggestive, evidence favouring this view was that of the 59 patients with this condition, 13 had never been on special diets prior to the detection of this skin condition.

A detailed clinical study showed that the number of insulin-patients was very high, as was also the incidence of cardio-vascular disease, in spite of the short (average) duration of the diabetes.

Insulin-œdema was found in four cases. Hyperglycæmia, difficult to control with insulin, was found in 11 cases, and raised renal thresholds for sugar were found in 6 cases.

Hypercholesterolæmia was a marked feature. There are, however, difficulties in the interpretation of this phenomenon. High blood-cholesterol values may be found in individuals with gall-bladder disease, and the latter condition is commonly associated with diabetes. High blood-cholesterols may also be due to the ingestion of plant sterols, which may give identical reactions with cholesterol.

In view of the above findings, it is suggested that xanthosis in diabetes mellitus is of more clinical importance than has generally been thought. It suggests an unfavourable prognosis.

Because of the simplicity with which the condition can be detected by the above laboratory method it is suggested that this test should form part of the routine management of the diabetic.

This work was done with the technical assistance of Miss Helen Chisholm and Miss Helen MacGachan.

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THE HEART IN HYPERTHYROID DISEASE*

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I HAVE chosen to speak to you on the heart in hyperthyroid disease, because this type of cardiovascular affection is of peculiar interest to all of us, whether we are clinicians, practical surgeons, or pathologists.

The pathologist studies the goitre-heart after death, or conducts experiments on animals, in order to discover why, or rather how, the heart is affected in diseases of this endocrine gland. The result of these studies has been that, while some, like Willius and Boothby,[1] Marine,[2] and Boas,[3, 4] have been impressed by the fact that the heart in hyperthyroid disease is mechanically overworked, and that this overwork leads to hypertrophy, exhaustion, dilatation and failure, the majority of pathologists are convinced to-day that the primary cause of these changes in the heart is not overwork, but a chronic toxic degeneration of the heart-muscle, which dilates, fibrillates and fails, unless resection of the thyroid is performed and the source of the trouble radically removed.

The clinician, however, who studies these hearts from the early onset of hyperthyroidism, when the effect on the heart of the raised metabolic rate is, at first, only an occasional attack of tachycardia, which later becomes permanent; who follows up these cases until, in the course of time, attacks of paroxysmal fibrillation supervene, and notices how these paroxysmal attacks become permanent; until finally the heart fails, and all the classical signs of congestive heart-failure make their appearance, with œdema, pulmonary congestion and engorged liver, cannot but reach the conclusion that there must be some truth in both the mechanical and the toxic theories of the pathologists.

To my mind, there can be no doubt of the truth of the toxic theory in the later stages of the hyperthyroid heart, particularly in toxic adenoma, when auricular fibrillation has become permanent and has lasted some time; for one reason, because we know that a permanent state of fibrillation, whether due to rheumatic or to arterio-sclerotic heart-disease, is almost invariably caused by a degenerative change in the heart-muscle. This degenerative process impairs the conductivity of the auricular muscle, and favours the production of irregular circus waves, from which a shower of irregular centrifugal waves is propagated down to the ventricles. That the heart in the later stages of hyperthyroid disease is degenerated is definitely proved after death, when the myocardium is found to be infiltrated with fat and the muscle fibres show a loss of much of their striation. There is also usually perivascular infiltration and sometimes areas of focal necrosis. Fatty infiltration and loss of muscle striation prove the correctness of the view that thyroxin in excess, as in toxic adenoma, or a perverted secretion, as in exophthalmic goitre, produces a degenerative effect on the heart. That this is true has been proved experimentally by Goodpasture,[5] Hashimoto[6] and others, who fed animals with thyroid tissue or injected thyroxin.

Now all this is true in the later stages of thyroid disease. In the earlier phases, however, before the onset of fibrillation, when the heart is merely beating rapidly, the state of the heart can be explained just as well by the mechanical theory, which says that the reason why the heart beats rapidly, dilates, and even fails, is because of the raised metabolic rate, which calls upon the heart to do more and more work, until it is exhausted. This rapid heart action is a physiological phenomenon, very similar to the tachycardia following exercise. When, for example, a person with a normal heart runs around a block or up a long flight of stairs, we expect to find the heart beating rapidly, the apex impulse strong, the first sound loud, the pulse rapid and full and strong, a rise in blood-pressure, and perhaps even a faint systolic murmur at the apex. All this happens because during exercise there is a greater demand for oxygen, metabolism is increased, and the heart

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is called upon to circulate this extra oxygen, and to remove the extra waste products. And this is what we find in the early stages of hyperthyroidism.

It is therefore, not surprising to find, as pointed out by Foster,[7] Pardee,[8] Willius and Boothby[1] and others, that on exertion the hyperthyroid patient complains of palpitation, dyspnœa and abnormal fatigue; but this need not be due to myocardial disease. It is caused by the extra metabolic demand of effort, which is superadded to the already raised metabolic level incidental to the hyperthyroid state. The metabolic requirements become so high that there is a considerable demand on the reserve of the heart to help circulate the extra oxygen and to remove the extra waste products, leading first to faster beating, then to fatigue and finally to failure. This is due mainly to the fact that the heart is being overworked. When, however, auricular fibrillation has set in, it is a sign that the heart is not only being overworked, but is being poisoned; and when the fibrillation has become permanently established and has lasted some time, we may be sure, as Goodall[9] says, that the heart is not only in a poisoned condition but is also becoming degenerated. I think, however, I can go a step farther and say that, even before fibrillations set in, the heart is being slowly but definitely acted upon by the chronic, low-grade toxic secretion which is being constantly injected into the circulation by the diseased thyroid gland. I believe therefore I am right in concluding that the result of hyperthyroid disease on the heart is such that the mechanical strain and fatigue, incidental to the raised metabolic rate, predispose it to the degenerative effect of the toxic secretion from the diseased thyroid gland.

Now the true clinician, as Sir James MacKenzie again and again pointed out, should interest himself not only in signs and symptoms as such, but also in their pathological interpretation, and should always try to express signs and symptoms in terms of pathology. Pathological theories as to why and how disease processes come about and develop, are therefore of interest to all true clinicians. Besides, a knowledge of pathological processes must influence treatment also. By seeking to understand disease processes, the clinician ceases to be empiric in his diagnosis and treatment. He strives to get a clear picture in his mind of what is actually happening in the diseased organ, and when he applies a remedy, even if it is only a placebo or physiotherapy on the one hand, or a vaccine or specific drug on the other, he tries to ascertain the exact action of his therapeutic measure, in order to know exactly what to expect, and how much to expect.

Thus, theoretically he expects to find, and practically he actually does find, that the thyrotoxic heart is enlarged, and beating rapidly and often irregularly; that the blood-pressure is raised; that in exophthalmic goitre the pulse-pressure is increased, the peripheral vessels relaxed and the capillary vessels pulsating; and that in all cases the basal metabolic rate is at a permanently raised level. He also knows that, as auricular fibrillation becomes established, the heart is passing from the stage of physiological fatigue to the stage of pathological degeneration. He is not surprised to find that, so long as the thyroid is pouring into the circulation an excessive or a perverted secretion, neither rest in bed, nor hypnotics, nor digitalis, nor even quinidine or iodine will permanently stop that heart from getting more and more poisoned and degenerated. All these measures have their individual uses, but he knows how much he can expect from them, and that sooner or later the disease will have to be attacked at the source by operation.

He will therefore have to get his patient into as good a condition as possible, and will then advise operation. By means of a careful clinical examination and a close study of the history, by means of an x-ray, or better a fluoroscopic examination of the heart, and lastly by taking an electrocardiographic tracing, he must convince himself, as well as he can with present-day methods, how far the degenerative process has progressed, and make an honest estimate of the surgical risk involved. He will know, for example, that if fibrillation has been permanent and has lasted some considerable time, the surgical risk is greater than in a case of simple tachycardia or only paroxysmal fibrillation, and that the heart will take longer to recover after operation. In trying to assess the risk, he will have to bear in mind that if hyperthyroidism supervenes in a patient with a history of rheumatic fever and rheumatic heart disease, or if thyrotoxic disease occurs in older patients who

have arteries that are sclerotic, the assessment becomes more complicated and the risk much greater.

By means of medical treatment, therefore, he will try to prepare the patient for operation, and thus reduce the risk of cardiovascular collapse during or after operation, or of post-operative hyperthyroidism and toxæmia. He will also see that he is in a position to give an opinion as to the risk and prognosis in each case. That is why in many of the larger clinics, both in America and in Europe, goitre patients are prepared for operation by cardiologists in cardiac clinics. This team-work is important, for the clinician must remember that here is an opportunity of curing one form of heart-disease by means of surgery. As Hamilton[10] says, "There is no other comparable condition of persistent heart-failure which is so consistently and safely cured (or at least markedly relieved) by surgical measures."

The medical treatment of hyperthyroid patients, both before and after operation, is so important, that it is worth while giving the main items in some detail. First, comes rest in bed, but as the patient is often emotional and restless, it will often be necessary to employ sedatives, such as bromides, chloral, luminal, or even morphine where there is much restlessness or insomnia. Next, comes the question of diet. The diet should be of high caloric value, to prevent extreme emaciation, but it is advisable to reduce the amount of concentrated proteins or stimulants such as coffee. The fluid intake should be from 2,000 to 3,000 c.c., but if there is œdema it should be reduced to 1,000 c.c. Septic foci, like decayed teeth, septic tonsils, or sinuses, should be treated as far as possible,—preferably under a local anæsthetic, for the presence of these prevents the return of the heart to normal. The compound solution of iodine, which reduces hyperthyroidism temporarily, may be given in doses of 10 to 20 minims 2 or 3 times daily for a week or so, but the heart-rate should be watched, and the basal metabolic rate should be estimated periodically.

If there are signs of congestive heart-failure, such as œdema, congestion at the bases of the lungs, and engorged liver, digitalis should be given, but not in massive doses; firstly, because moderate doses are sufficient to remove œdema in these cases, and, secondly, the chances of reducing the heart to normal rate are not so great as in other types of fibrillation. Besides, as Plummer[11] has shown, patients with Graves' disease seem to be particularly subject to cerebral toxic effects from digitalis in massive doses. I would therefore give 20 to 30 minims t.i.d. for 2 or 3 days, and then reduce the dose to 15 or even 10 minims t.i.d., while watching for signs of untoward toxic effects. If the signs of congestive failure disappear rapidly, but the heart continues to fibrillate, I would make an attempt to restore a regular heart-action by means of quinidine. After stopping digitalis and waiting for twenty-four hours, I would give a test dose of 2 or 3 grains in the evening, and if there are no signs of hypersensitiveness to the drug, I would give 3 grains t.i.d. on the following day; then 4 grains t.i.d. on the third day; and 5 grains t.i.d. on the 4th and 5th days. I would then reduce the dose to 4 grains t.i.d. on the 6th day, and 3 grains t.i.d. on the 7th; and continue giving 3 grains once a day subsequently. In many cases such a course of quinidine will restore a normal rhythm, but even if the heart still remains irregular, it will often be found that the pulse has become somewhat slower, fuller and stronger, which means that we have improved the circulation. That is something gained in preparing a patient with a degenerated heart for operation.

If, however, we find the heart fibrillating, without gross signs of congestive failure, we must not expect much from digitalis therapy. From the point of view of therapeutics, the fibrillating heart in hyperthyroid disease differs from that found in rheumatic or arterio-sclerotic heart-disease, for in hyperthyroidism the vagus is low in tone, and therefore digitalis, which acts partly through the vagus, cannot control the heart-rate so effectively as in other types of fibrillation. Occasionally, however, it is surprising to find that digitalis does produce a marked effect on the heart-rate, so it is worth while giving it a trial even in these cases.

To change the rhythm of the heart, however, and bring about a regular heart-action before operation is very desirable, since, as Foster[7] says, "the operative risk in auricular fibrillation is appreciably greater, and, besides, these sensitive patients are unusually conscious of the turmoil of arrhythmia, and so soon as it ceases they at once become more quiet and improve

surprisingly." It will be necessary, therefore, to give quinidine by some such method as I suggested, provided we can exclude advanced myocardial degeneration by clinical means, by x-ray, or by means of the electrocardiograph. If the x-ray plates show a marked dilatation, or even where there is no cardiac enlargement, if an electrocardiographic tracing shows well marked abnormalities, such as inverted T waves not due to digitalis, or the peculiar T wave described by Pardee, which is suggestive of coronary disease, or a very marked delay in auriculo-ventricular conduction as shown by the P-R interval, or delay in conduction within the ventricles as shown by a marked notching or slurring of the QRS complex, or evidence of bundle branch block, or weakness of the myocardium as shown by abnormally low voltage of the various deflections, I would consider the patient a more serious operative risk, and would refrain from giving quinidine, which might depress the heart still further. If it is thought, however, that operative interference is urgently needed, extra care will be needed in choosing and giving the anæsthetic. Some surgeons might consider the question of doing a ligation first, while others would deem it more advisable in such cases to resort to x-ray therapy, and not subject them to operation at all.

When, however, as happens in most cases, there is no indication of advanced degenerative disease of the heart, we may expect, as a result of resection of the gland, that the fibrillating heart will resume its normal rhythm in about two-thirds of the cases. Those cases, however, that continue fibrillating after operation, I would give the benefit of another course of quinidine, for nobody can deny that it is desirable to obtain, if possible, a regular heart rhythm, even if, as sometimes happens, the patient still gets occasional attacks of fibrillation or tachycardia in spite of quinidine. The patients themselves often feel the difference, and ask for the drug. Quinidine is particularly indicated in those cases where fibrillation makes its first appearance after operation.

The toxæmia sometimes following operation is either acute and characterized by extreme restlessness, or subacute and characterized by increasing stupor. In either case, injection of glucose, with or without insulin, and treatment with iodine are of great help. It is advisable, however, to give iodine after operation in any case, for, as proved experimentally by Else[12] and others, it controls regeneration of the remaining thyroid tissue, and helps to avoid the occurrence of thyroid crises, which used to be, and sometimes still are, the bugbear of thyroid surgery. In the presence of a post-operative "thyroid storm," I would give from 75 to 100 minims of Lugol's solution of iodine in 24 hours, as well as glucose and much fluid, and then reduce the iodine to 30 minims per day during the patient's stay in the hospital. Many surgeons continue to give a prophylactic dose of 10 minims per week for three months after the patient has been discharged from hospital, for the purpose of preventing hyperplasia of the remaining portion of the thyroid gland. As regards iodine for toxic adenoma, many prescribe it as for exophthalmic goitre, but more cautiously, and in smaller doses, and not for such long periods.

Now, in conclusion, let me take up a moment or two of your time, and give you a short abstract of the history of one of Dr. Fahrni's cases, because it shows some unusual features. This x-ray picture, taken by Dr. Michaud, shows the heart of a woman, forty-three years old, who had an attack of rheumatic fever eighteen years ago, when she was laid up with pain in the joints for a whole month. She had several subsequent attacks, but eight years ago she first noticed a swelling in her neck. The heart, as you see, is a little enlarged to the right and left, but it is the left auricle that shows the most prominent enlargement. The heart has, as the French so graphically describe it, lost its "waist". On admission to the General Hospital, it was found that her heart was fibrillating, and that her basal metabolic rate was +43, and later +53. She was put on Karrel's diet, and treated with Lugol's iodine and digitalis, and then discharged, as she refused operation. On November 9, she was admitted to this hospital, and Dr. Fahrni did a resection of the thyroid gland. As a result, her metabolic rate came down to +8. She was discharged on November 14, when her heart rate was 88 and her pulse rate 70. On January 9, however, she was re-admitted with what she described as an "irregular beating of the heart and a pounding in the chest." It was found that her heart was still fibrillating, and that her heart-rate was now 110 and her pulse 82. She was transferred by Dr. Fahrni to the

medical service, under Dr. Adamson, who asked me to report whether this would be a suitable case for treatment with quinidine. My report was as follows:—

"This patient has had rheumatic heart disease for close on eighteen years, and yet she was never decompensated nor suffered from auricular fibrillation until eighteen months ago, when there was obvious hyperthyroidism. I therefore infer that the fibrillation was due more to her goitre than to her rheumatic heart condition. In my opinion, therefore, there is strong indication in this case for trying quinidine, and I do not think there is much risk." This was dated January 13.

We started by giving her a test dose of 2 grains on January 15th, and on the 16th we gave her three doses of 2 grains each. On the following day she complained that she was feeling somewhat nauseated, and on examination it was found that her heart was beating regularly—*i.e.*, we got a normal rhythm after a total of only 8 grains of quinidine. We therefore reduced the dose to 2 grains a day, and the heart-rhythm continued to be regular. On February 2, we stopped the quinidine, in order to see whether she could manage without this drug, but as she complained of palpitation and rapid heart-action, we have since continued to give her one dose of 2 grains every day, and her heart has been beating regularly at the rate of 80 per minute. I believe it will be possible to stop the quinidine after a time, but I would give her 2 grains once or twice a week for two or three months after she is discharged, in order to prevent a recurrence of fibrillation. This small dose will probably be sufficient to keep her heart regular, seeing that she is so sensitive to this drug.*

To show you a case of hyperthyroidism in which quinidine is definitely contra-indicated, I would present another of Dr. Fahrni's patients who was admitted with auricular fibrillation and aphasia. Not only is his heart in poor condition, but his attack of aphasia must have been caused presumably by an embolus from his fibrillating auricle. If we gave him quinidine and succeeded in getting his auricle to start contracting in a normal fashion, another thrombus might thereby get detached and produce embolic trouble in his brain, in his lungs, or elsewhere. That is a risk we must not take; so quinidine is here contra-indicated.

I want to thank Dr. Fahrni, Chief of Surgery, and Dr. Adamson, Chief of Medicine, for their encouragement, which has enabled me to present this paper to you on a subject which must be of interest to all of us.

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* This patient, examined 2 months after this paper was written, still has a regular cardiac rhythm.

Diathermy in Gynæcology. — Diathermy is used in gynæcology for four different groups of indications: pelvic inflammations, gonorrhea, noninfectious gynæcologic conditions and cancer of the uterus. George Gellhorn, St. Louis, discusses each of these items. As with all other therapeutic methods, the results depend, to a large extent, on the proper technique. The proper selection of cases for this treatment is of the greater importance. Only an uncritical enthusiasm can regard diathermy as a panacea. There is no cure-all and there never will be. The advent of diathermy has not rendered older methods of treatment obsolete, and the best results will be accomplished by him who combines this new therapy with other tried means by which the defensive apparatus of the body is stimulated to energetic action. In the realm of gynæcology the application of high degrees of heat by means of diathermy has led to the development of several important and promising methods of treatment of various pathologic conditions. For the present, practical experience has been accumulated in the therapy of chronic pelvic inflammations, gonorrheal infection of the urethra and cervix, cancer of the uterus, and several minor gynæcologic ailments. The pleasing results should not, however, obscure the fact that the new method is only in its infancy, and that a great deal of further careful clinical observation is needed to establish the possibilities and limitations of this new approach.—*J. Am. M. Ass.*, March 31, 1928.

THE THERAPEUTIC VALUE OF MALARIA INOCULATION IN CEREBROSPINAL SYPHILIS AND GENERAL PARESIS, WITH SOME OBSERVATIONS UPON THE USE OF TRYPARSAMIDE IN ALLIANCE THEREWITH*

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THE active treatment of cerebrospinal lues was begun at this clinic in May, 1923, using tryparsamide on some fifty cases. As it does not fall within the scope of this paper to report our results with tryparsamide in detail, it will suffice to say that we now regard this arsenical drug as a valuable adjunct, to be employed: 1, in cases in which malarial inoculation for any reason is contra-indicated; 2, as an additional treatment after malarial inoculation; and 3, as a preparatory treatment in certain selected cases.

Since May, 1925, we have made use of malaria in every case where it was not contra-indicated. From May, 1925, to October 30, 1927, we admitted seventy cases of cerebrospinal lues. In five the diagnosis was doubtful. Five were admitted *in extremis* and died without treatment. Three died before prodromal symptoms of malaria developed. Fifty-seven cases were successfully inoculated. Seventeen are recent and are under active treatment, therefore we are excluding them from this report. Forty cases remain and our results in them, stated briefly, are as follows: 16 were discharged for periods varying from two years and ten months to six months; 13 are dead; and 11 are regarded as chronic. The discharged patients are in all cases working and able to make their own living. The favourable results obtained from the treatment may be compared with the report of the Verdun Protestant Hospital for 1922, the year immediately preceding the introduction of this treatment. General paretics admitted: 15; none discharged; none improved; deaths 11; remaining at the end of the year, 4, all unimproved. Also, compare with the report for the thirty-three years of the institution's existence prior to 1922. General paretics admitted: 330; recovered one; discharged improved 37; discharged unimproved 62; deaths, 214; remaining, 16, all unimproved.

The original patient was taken to New York and inoculated through the kindness of Dr. Kirby, Chief of the Psychiatric Institute, Wards Island, New York. We have also to thank Miss Fish, who has done our serology, Dr. H. V. Robinson, our consulting physiotherapist, for his work with our tabo-paretic patients, and Dr. Norman Viner, whose advice and assistance have been of great benefit. No patient has been inoculated without absolutely positive serological findings as to gold curve, Wassermann test, chemistry, and cells. In addition to the case report, a serology and treatment record was started for each patient before inoculation, and was kept up to date.

Technique and Course

The ordinary technique of inoculation was pursued, namely: 2 c.c. of malarial blood was given by the intravenous method. Clotting was obviated by adding 0.2 per cent sodium citrate. Occasionally, we have given in addition subcutaneously 3 c.c. of blood. The shortest incubation period was forty-eight hours; the longest, ten days. Prodromal symptoms, consisting of slight fever and malaise, then appeared. This period lasted for two days to a week, then usually subsided, and within twenty-four hours the patient exhibited the typical malarial chill. While the organism is benign tertian, the fever charts of each patient vary greatly, and the regularity and severity of the chills also present anomalies in the individual chart during the course of the disease. For example, some patients may experience one chill every day for three or four days, and then may not have one for three days to a week; or they may experience them at intervals of three days, or, perhaps may have two chills in thirty-six hours. One patient had the unusually severe course of ten chills in twelve days; another took two months to total ten chills. The appearance of the charts also varies. Some present the typical pinnacles, ranging from 102° to 107° F. per rectum; others

* From a clinic at the Verdun Protestant Hospital, Verdun, Que.

show a very gradual rise and subsidence, lasting possibly two days; and we have had all these various types combined in the same chart. One chart looked very much like that of a typhoid. It may be of significance that in practically all our cases in which good results were obtained, the chart was of the more typically regular kind and the chills quite severe, ranging from 104° to 106° per rectum.

The subjective and objective picture presented by the patients followed the same anomalous lines as do those of febrile disease in its reactions in individuals the world over. In nearly all cases there was with the onset of the chills a distinct exacerbation of the syphilitic elements, both clinically and serologically; the cells, curve, and chemical features were heightened, and the original neurological signs were increased. If the patients are mentally able to do so, they themselves notice this; they will complain of increased uselessness in the legs, or increased pain, less ability to walk, more aggravating vesical symptoms. The urines were examined during our first twenty-five cases every day; we now do this only every two days, but albumen is not a constant feature during the malarial course. Slight albuminuria, however, is present in 50 per cent of the cases. The enlargement of the spleen showed variation. In two instances it was easily palpable in the pelvis; in several no increase in size was detected; usually, only slight hyperplasia occurred. Jaundice, clinically not severe, occurred in about 20 per cent of the patients, why, we do not know, but we have never found it necessary to terminate a case because of it.

The mental reaction of each patient under the induced fever was variable to an extreme degree. We had excited, violent, grandiose, totally disoriented patients, who became to all appearances sane after three or four chills. They maintained this improvement and were discharged so soon as they were physically able to leave the hospital. The first one of this type was inoculated with malaria on May 15, 1925. He became normal mentally during its course, and was discharged on July 16th. He has carried on his business ever since in Montreal, and has had no treatment except twelve doses of tryparsamide. In September, 1926, and September, 1927, the serological picture of his spinal fluid was entirely negative. The blood each time showed one plus. Conversely, we had one very demented patient who showed no improvement for six months after his malaria. Tryparsamide, however, was vigorously used and he then began to improve. He was discharged eighteen months later, normal enough to remain in the outside world and carry on a small clothing business. Generally regarded, however, the cerebrospinal luetics, who are destined to show good results, show mental improvement, either during the course of the malaria or soon after the termination of it.

The care of the purposely inoculated malarial fever patient differs greatly in its method from that used in an ordinary case. Our object is not to lessen the fever, but to allow it to reach its maximum. Hence the instincts of the trained nurse which prompt her to sponge her patient the minute an elevation occurs are to be repressed most emphatically, by the physician in charge. During a chill and subsequent elevation of temperature we simply keep the patient as warm as possible, and direct no sponging until the temperature is definitely on the down grade; then a light sponging may be given and the sweat-soaked sheets and clothing changed. Headache may be greatly relieved and not infrequently controlled by an icebag; phenacetin or aspirin is never given. We are satisfied that it interferes seriously with the fever. We have not found it necessary to give stimulants, hence we have not had to worry over the fact that digitalis, strychnine, or alcohol may interfere with the chills. We often give a tonic containing iron during the course of the fever; and such is administered in all cases immediately the high temperature is terminated. Patients are encouraged to drink all the liquid they can, but they are not kept on a fluid diet exclusively; nourishing solids are given if they feel like eating them. Purgatives, enemata, whenever necessary, and a strict watch to prevent bed sores, complete the treatment. If a sedative is required, hyoscine or paraldehyde do not seem to lower the fever materially, but it is surprising how little of this is necessary. Our patients are screened in the mosquito season, though we are not at all sure that this is necessary.

After eight to twelve chills, depending on the condition of the patient, the fever is ended with quinine either by mouth or vein. If by mouth, 10 grains of quinine hydrochloride are given in

capsules three times a day for two days: then, 5 grains three times a day for five days. If by vein, 7½ grains of quinine-urea hydrochloride are injected at daily intervals for three or four days. We wish to note here the ease with which this type of malaria can be controlled. Our great trouble is not to stop it, but to keep it going. We have had three cases of spontaneous remission after three chills had occurred. One patient we found impossible to inoculate. In one case, three one-drachm doses of Easton's syrup were given by mistake, which completely stopped the development of symptoms. A case in a local hospital received by mistake 10 grains of aspirin compound; the chills and fever were stopped for a period of four weeks, though they eventually recurred. In our entire series we have never had a recurrence of fever, and have never found the plasmodium after three or four days of quinine administration. The fact that one patient will show an entirely different chart from the patient from whom he has been inoculated is no doubt bound up with the same cause, namely, that we are dealing with a type of plasmodium in which the normal alternation of generation has been stopped. The mosquito stage has been absent for a great many generations, for our strain was obtained from New York after it had been through over one hundred patients there. The observation of James of London, that patients inoculated by the mosquito were harder to stop than patients inoculated by injection of blood would seem to bear this out.

In nearly every case tryparsamide is given immediately with the quinine, and a course of ten to fifteen doses is given, either in the hospital or in the outdoor department. A course of bismuth is also given at the same time. These courses are usually repeated within two or three months. We have completely stopped salvarsan and mercury in these patients. In tabo-paretic cases, where the tabetic signs other than crises still persist and are very annoying to the patient, we give in addition a course of galvanism and diathermy to the spine. Some patients profess to obtain marked relief from this, and we have seen no ill effects.

PHYSICAL CONTRA-INDICATIONS

Physical contra-indications are not numerous. We have used malarial inoculations in the case of mild heart lesions, and also in patients with slight albuminuria, and no ill effects were noted. Of our thirteen deaths, five occurred from four months to two years after the treatment by malaria. In each case the disease seemed almost unaffected by the treatment, and pursued its course with, possibly, slight retardation. In four more, the malaria was allowed to run the whole course of eight to twelve chills, and the patient succumbed to broncho-pneumonia a few days after the termination. As will be explained later, these eight deaths nearly all belonged to types in which we now consider malarial inoculation dangerous or of little use. In the other four cases, however, we had severe cerebro-spinal lues, and this we now believe to be a real source of danger in the employment of this method of treatment. Here we refer to the above-mentioned exacerbation of the symptoms.

During the past year we have had only two deaths and we wish to cite the last case as an example of the above. This was a man of sixty, whose serological picture had shown about one hundred cells for the past year. At the time of his inoculation the curve was of the meningitic type; four + Wassermann; four + albumen and globulin; ninety-five cells. Physically, he was in fair shape; lungs, heart, and kidneys were negative. Neurologically, he had Argyll-Robertson pupils, slight spasticity, slight ankle clonus, a suspicion of Babinski on the left side, marked Rombergism, and a tabetic gait. Vesical symptoms were also present. There was in addition a history of several fainting spells in the last year and an original luetic infection thirty years before. His prodromal symptoms consisted of two rises of temperature to 101° F. on the third and fourth days of incubation. On the fifth day severe intractable hiccoughing developed, also constant vomiting; the neurological signs were increased in intensity. Slight ptosis of the left eyelid was also noted. Quinine was at once administered intravenously. The patient died in four days, apparently from nothing else than a violent lighting up of his luetic meningitis.

RESULTS

Excluding the fatal cases, every patient subjected to the above routine showed a marked improvement, serologically, physically, and mentally. Some of the types, which we have

noted as chronic, are practically negative serologically. Physically, they are fat and healthy; in other words, the process in them would seem to be a degenerative one rather than toxic, and the degenerative process has gone far enough to leave such a degree of mental defect, that it is impossible for them to carry on in the outside world. Many of them, however, are workers; from being the most troublesome of patients they are now among our best. This alone, from the standpoint of an institution, makes the treatment well worth while. While early treatment would seem to be the logical deduction from the above facts, it is to be noted that some degenerate very early, others very late. We had one case of fair remission in a patient after three years spent under restraint before he was sent to us for treatment. In three cases we were able to institute treatment within a month of the onset of the first mental symptoms, nevertheless the patient progressed toward a state of mild chronic dementia. The type of case and the age will, however, give some indication of the prognosis, as may be seen from the following analysis of our results.

Type of Case	*No.*	*Discharges*	*Deaths*	*Chronics*	*Discharges*	*Deaths*
Euphoric	17	12	2	3	71%	11%
Confused Demented	15	3	8	4	20%	60%
Hallucinated .	5	1	0	4	20%	0%
Persecutory or Paranoid	3	0	2	1	0%	66%

From the standpoint of age the following may be submitted:—

Age	*No.*	*Discharges*	*Deaths*	*Chronics*	*Discharges*	*Deaths*
Under 35 ..	5	1	4	0	25%	75 %
35 - 55 ...	30	15	4	11	50%	10.3%
55 and over.	5	0	5	0	0%	100 %

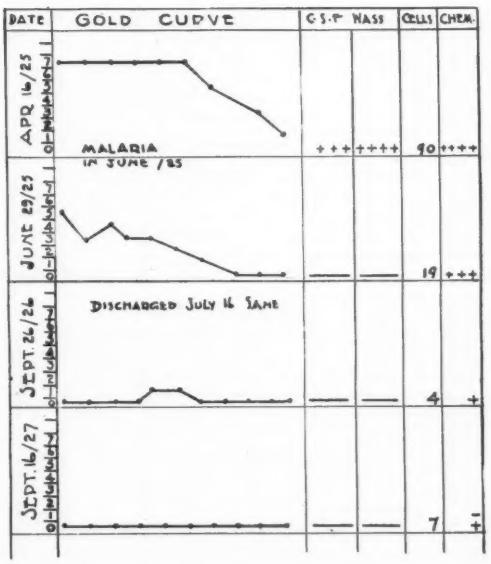
It is of interest to note that the four patients under thirty-five did not succumb to malaria immediately; their deaths all took place from six months to eighteen months after the termination of this truly fearsome fever. They were of the type in which apparently the disease had not been arrested and pursued a more or less unretarded course. Also, four of our older deaths, that is, those over fifty-five years of age, were of the demented and confused type. That is to say, in young cases we have had very little success in retarding the disease, while old demented patients we have found very bad risks for malaria. In all the younger deaths, the period of incubation was shorter than the average, *i.e.*, seven to eleven years. Whether this indicated a strain with more affinity for nervous tissue, or less mental and physical resistance on the part of the patient, is a matter for speculation.

Serologically, it is a curious fact that mental improvement coincides more nearly with the general physical improvement of the patient than it does with the spinal fluid serological improvement. We have several patients who have left the hospital, apparently normal mentally, but whose serological condition, so far as the gold curve, Wassermann reaction, and albumen are concerned, had improved but little. In all cases, however, diminution in the number of cells had occurred; also in all the serological picture finally improved, more particularly with regard to the cells and globulin, which in the case of patients with complete remissions became practically negative. The following table gives our results after treatment in regard to the cerebrospinal serological state at the time of discharge.

Serological State	*Discharged*	*Chronic*	*Deaths*
Negative	5	4	2
Practically negative ..	2	3	0
Marked improvement ..	6	4	0
Practically unimproved	3	0	10

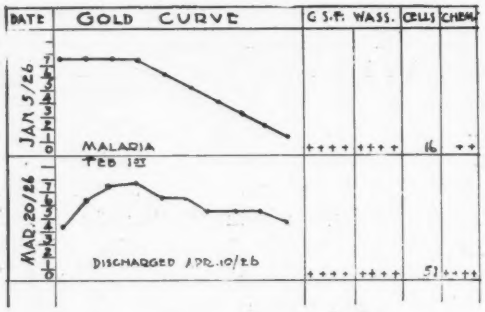
Below are given reproductions of typical serological charts, selected to show some of the different types tabulated above.

CHART I.—CASE 2



Case No. 2.—The serological chart of a very euphoric grandiose patient, forty-two years old; admitted in April, 1925. He was given malaria in June, 1925, and became sane during its course. He was discharged July 16th with only a moderately improved serological picture. He has managed his business ever since, and has received tryparsamide from his family physician. It will be seen that in 1926 and 1927 his spinal fluid was practically negative. There has been no return of mental symptoms, and his physical condition is good.

CHART II.—CASE 18



Case No. 18.—The chart of a male patient forty-seven years old; admitted January 5, 1926. Violent and euphoric. He received malaria February 1, 1926, and by April 10 was apparently normal mentally. His physical condition had greatly improved, but it will be noted that the serological picture had actually become worse. Since discharge he has received twelve treatments of tryparsamide in the outdoor of a local hospital. We have no record of any further serological examination, but on November 10, 1927, the patient visited the Verdun Protestant Hospital and was seen by us. He appeared normal to mental examination, and there were no physical signs except Argyll-Robertson pupils. A lumbar puncture was refused.

Case No. 5.—The chart of a typically chronic case. The patient was a male, thirty-eight years of age, demented and confused; admitted in July, 1924. He was treated up to May, 1925, with tryparsamide and mercury. Malaria was then given and the patient has received a few courses of tryparsamide since. His physical condition has much improved since admission and, in spite of the fact that he has general paresis, it is quite possible that he may live a long time. He is and probably always will be a resident of the hospital, but he is very easy to take care of, being clean and orderly. He is, however, slightly hallucinated and shows considerable mental enfeeblement. In other words, the disease has seemingly been arrested, but so much degeneration had taken place before this that his complete mental restoration was impossible. Eight lumbar punctures have been omitted from the chart owing to lack of space. Had they been included the gradual improvement in the serological picture would have been shown in a more striking manner.

CHART III.—CASE 5

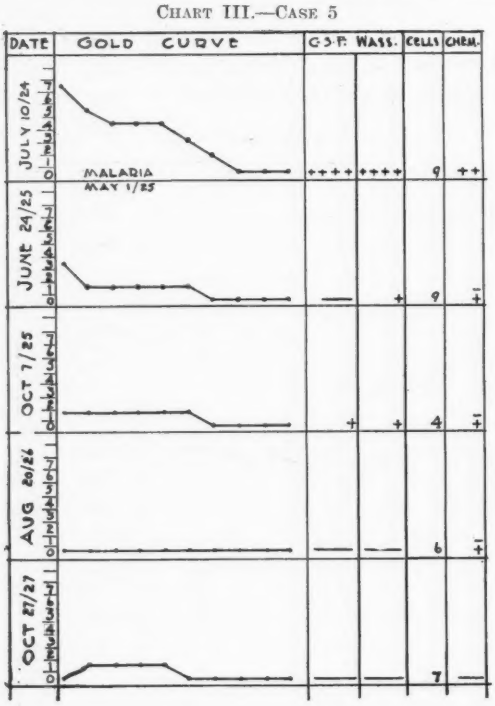
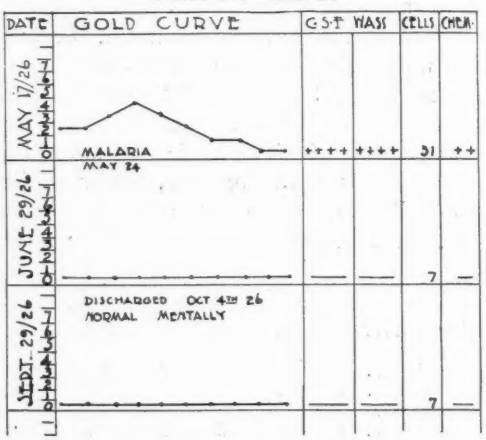


CHART IV.—CASE 21



Case No. 21.—The serological chart of a confused, disoriented female patient forty years old. The serological abnormalities cleared up immediately after malaria, which was given in May, 1926, but the patient did not become normal mentally until September. The serological picture at that time was still negative. The patient has remained normal up to the present time, and her occupation necessitates hard mental and physical work. She was seen in February, 1928, and was doing well.

Wherever a satisfactory remission took place it was invariably accompanied by a marked improvement in the physical condition of the patient. His strength returned, his appetite improved, he put on weight, and lost to a marked degree his neuropathological signs, (we have to except here the eye signs). We found exactly the same relation between the serological picture and the physical and mental condition to exist in the cases which achieved satisfactory remissions under the old tryparsamide treatment. Differentially, we must at least consider the possibility that the results

are obtained by a marshalling of the resistive forces of the body rather than a direct spirochæticidal action.

We have had five cases of optic atrophy among this series of forty. In three of these the atrophy was present on admission; in two it has developed since; both of these have received over twenty doses of tryparsamide; none of them, however, are progressing to any marked extent. This is a contrast to the results in tryparsamide where we have had ten begin under treatment.

DIAGNOSIS

We should like to emphasize here the great importance of an accurate serological examination for the diagnosis, more particularly the determination of the cells, albumen, and the gold curve. Our experience with the Wassermann test is that it is much more variable than any of the others. We have a patient now recovering from malaria who for nearly three years was regarded by two competent physicians as a case of dementia præcox. When he was finally committed to us, his history was read to the students as one typical of schizophrenia. Schizophrenia also seemed the probable diagnosis after mental examination. His only physical sign pointing to cerebrospinal luetic involvement was absent abdominal reflexes. A routine examination of the blood and spinal fluid showed 4 plus Wassermann, three plus globulin and albumen, twelve cells, and a very marked paretic curve. He nearly died during his first few chills, and we feel that the best we can expect for him is that he will become chronic. We have, also, just discharged a woman, who on admission showed a typical præcox history and picture. There was not a physical sign of cerebrospinal disease present. A routine serological examination, repeated, showed a four plus blood and cerebrospinal fluid. Complete reduction in the first five tubes of the gold curve series, a three plus globulin, and fifty-four cells were present. She recovered from her psychosis under malaria, and has gone out with a serological picture unimproved, except that the cells are only thirty-eight. Tryparsamide and bismuth are being given by her family physician. Both of these cases had a history of boulimia before the onset of mental symptoms; this history is quite common in all of our paretic cases, particularly the atypical ones.

Where the serological picture is negative, as it undoubtedly is in some cases of cerebrospinal lues, the diagnosis presents some difficulty, since the mental and physical signs may be, and indeed often are, atypical. We have found that tryparsamide, used as a provocative agent, has greatly aided us in solving the cause of the mental trouble in this type of patient. We hope to publish more on the subject of tryparsamide used in this manner, but at present we will content ourselves with saying that we make a routine of the provocative dose with this drug in every mental patient who comes to us with a positive blood, but a negative spinal fluid. We do not feel that we are justified in accepting the first negative result.

CASES WITHOUT PSYCHOSIS

It may be of interest to mention briefly a type of work which we have undertaken chiefly within the last year. We refer to the treatment of cases of neurological lues as soon as the diagnosis has been made, and before mental symptoms make it necessary to send such a one to a mental hospital. Generally speaking, they are being attended by the family physician, our part being confined to consultation and the actual inoculation of malaria. Our work is too recent to speak of results, but we would like to present the history of the first cases of this type, now of one year's standing.

CASE 1

Patient, a clerk, 53 years of age, who called in his physician on account of intense supraorbital pain from which he had suffered for a week. The doctor obtained a history of lues fourteen years ago, with inadequate treatment at the time, but active treatment with salvarsan for the last eighteen months. The patient complained of impotency for one year, and incontinence of urine and fæces for the last six months. In the last month these symptoms had become fairly constant. The patient was in bed. Rombergism was so severe that he could only stand up by holding on to the furniture; he was almost unable to walk; there was marked bilateral Babinski, extreme bilateral ankle clonus, great spasticity in both legs, and sensation in feet and legs was much impaired. The eyes were negative as to disease. The cerebro-spinal fluid showed a weakly positive gold-curve, and a strongly positive Wassermann test, triple + globulin, and 230 cells. There were no mental symptoms. Malaria was given, and he had ten violent chills. One month after the termination of his malaria the Babinski had disappeared, also the spasticity, and the muscle sense was much improved. Rombergism was only slightly present. The supraorbital pain had disappeared, the incontinence was gone, potency had returned, and there was no ankle-clonus. Serological tests showed an absolutely negative spinal fluid, and on two tests the blood was found negative. He went back to work two weeks later, and has been working ever since. His physician has given him six or seven doses of tryparsamide, but for the last nine months the patient has

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felt so well that he has dispensed entirely with medical services, and physically, appears to be well.

CASE 2

A women of 39, showing the typical picture of tabes, was referred to us by the family physician because of intense gastric crises, which one year's treatment with salvarsan and mercury had failed to relieve; in fact the crises were growing worse. Her serological picture showed a low gold-curve, a positive Wassermann test, slight albumen, and three cells. In a case like this treatment by malaria was unlikely to be of use. The crises, however, became so severe that it was given as a last resort. She had ten very satisfactory chills, with a good deal of increase of pain during the first two or three. After the termination of the chills tryparsamide, bismuth, and the galvanic current to the spine were given. The patient's Rombergism and her tabetic walk are now no better. She declares, however, that her pains (to us tabetic) have not been one-quarter so severe as they were before the malaria was inoculated, now some eleven months ago.

This case is given for what it is worth; it is the only typical one of tabes which we have treated with malaria. Among our tabo-paretics, however, we have had three who suffered on admittance from severe crises. The pains in each case have ceased after treatment by malaria. We also note in the literature that O'Leary (*J. Am. M. Ass.*, July 9, 1927), reports practically similar results in his tabetic cases.

SUMMARY

1. Malarial inoculation has greatly decreased the death rate of cerebrospinal lues in our institution, and has resulted in many very gratifying remissions. In forty unselected cases sixteen achieved satisfactory arrests.

2. Patients of the expansive grandiose type, about the fifth decade of life, respond most readily to treatment, and 71 per cent of this type were discharged with the disease apparently arrested.

3. This treatment has transformed many very troublesome patients into co-operative ones in our hospital.

4. Malaria induced by inoculation is very irregular in its course. It is easy to terminate, and care must be exercised that it is not reduced or ended by indiscriminate drug administration.

5. There is often little relation between the serological and mental condition, but mental improvement usually parallels physical improvement.

6. A danger which must not be overlooked is the lighting up of initial infection in the cerebrospinal nervous system.

7. Optic atrophy occurred in our malarial series much less frequently than in our tryparsamide series.

8. Serological examinations afford frequently the only means of diagnosis. Tryparsamide is of use as a diagnostic agent.

9. We believe that malarial inoculation can be used with good results before the onset of mental symptoms in cases of cerebrospinal lues of any type.

Subacute Combined Sclerosis. — Howard M. Bubert, Baltimore, reports a case which shows that improvement may be obtained in certain well established cases of subacute combined sclerosis complicating pernicious anæmia, that have not progressed too far, with the Murphy-Minot high liver diet. This case was observed over a period of almost five years. With the conventional methods of treatment in vogue before the introduction of the Murphy-Minot diet, the progress of the patient was steadily downward, except for periods of temporary improvement. The neurologic condition early in 1926 was rather far advanced, as was evidenced by numbness and tingling in both the upper and the lower extremities, inability to appreciate the number and character of objects, extreme loss of equilibrium with resultant tabetic gait, which required two canes to enable the patient to walk at all, and then haltingly, and complete loss of the patellar reflexes. Mentally, the patient was depressed and irritable, and complained of failing memory. His sight was becoming dim. Following about one year of the diet advocated by Murphy and Minot for pernicious anæmia the patient became bright and alert and was able to walk briskly. His equilibrium was exceedingly well improved, as was indicated by a negative Romberg sign and his ability to climb shelves for records, formerly obtained for him by some one else. The patellar reflexes returned, although they were hyperactive, and the sensory disturbances of the extremities cleared up entirely in the hands and arms and, while still present in the lower limbs, were definitely improved. The condition of the blood was also markedly improved in this case.—*J. Am. M. Ass.*, March 24, 1928.

THE ADVANCE OF DIAGNOSIS IN RELATION TO DUODENAL ULCER

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Department of Gastro-Enterology, Lockwood Clinic,

Toronto

PROBABLY in no other field has there been such a rapid improvement in diagnostic ability as in the case of the gastro-intestinal tract. A comparatively short time ago gastro-intestinal conditions were being diagnosed by the family physician as dyspepsia, chronic indigestion, acute indigestion, inflammation of the bowels, etc. To-day, our patients are not apt to be contented with such a vague terminology, and expect us to be much more specific in our findings.

The clinical laboratory with its numerous tests, sometimes indifferent, but more often proved and dependable, is able to shed so much light into hitherto obscure corners that the clinician of to-day is depending on his co-worker in the laboratory to an ever-increasing extent, to prove or disprove his conclusions, and on the x-ray findings as a means of corroborating his opinion.

In the diagnosis of gastric and duodenal lesions the assistance rendered by skilled workers in these fields has become practically indispensable, and indeed, it is questionable if there are many people, except a few in isolated communities, who are satisfied to be treated medically or surgically, unless the best diagnostic measures have been brought to bear upon their problem and an honest attempt made to ascertain their condition. Public opinion is well informed through the press and by life-extension institutes as to the advances science has made in providing ways and means of investigating ailments, and an educated public is an excellent thing for the profession, making for efficiency and service unparalleled in medical history. The one drawback in the attitude of both doctor and patient is that because of the rush and stress of modern life one is apt to use the aids to make the diagnosis, rather than to confirm an opinion already formed from careful clinical investigation.

One cannot but urge a fuller appreciation of Sir W. Mackenzie's work at St. Andrews, and of the tremendous value it would be to medical science if the family doctor would keep case-reports of his patients, making a permanent record of the symptoms and physical signs discovered in those who seek his professional skill. Even minor and apparently unimportant findings, viewed as a whole ten, twenty or thirty years hence, would doubtless yield invaluable knowledge by which to recognize and remedy disease in its incipient stages.

When the clinical history has been carefully taken one does not hesitate to say that it is possible to make a correct diagnosis in at least 70 per cent of duodenal ulcer cases; and where the history has been carefully developed without leading or suggestive questions being asked, and the gastric analysis of a test meal is available, one need not be deterred from making a positive diagnosis even in the face of negative x-ray findings. A record of some twenty-six cases kept by me, in which the x-ray findings of one of the leading roentgenologists on the continent were negative, showed that the clinical history was so conclusive that they were recommended for surgery when seen by the surgeon in consultation. In twenty-two of these, duodenal ulcer was demonstrated at operation, and in the other four either a chronic appendicitis or a cholecystitis was found to be responsible for the patients' symptoms.

Most of us were taught that duodenal ulcer occurred principally in young chlorotic girls, usually as the result of long continued errors in diet. Definite localized pain covering an area the size of a shilling, or severe pain, the so-called acute indigestion, was stressed as a cardinal symptom on which to base a diagnosis. Hæmorrhage, either as bright red blood in the vomitus, or as dark tarry stools in one of the patient's attacks was to be looked for, and a positive diagnosis was often held in abeyance until this occurred. Our viewpoint has undergone a marked change thanks to the surgeon, the roentgenologist, and the careful observation of trained clinicians. In any large series of cases, males with duodenal ulcer far

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outnumber females. The condition occurs principally after eighteen years of age, although a few cases have been reported in very young patients, and it is not uncommon to have patients at the other extreme of life with well marked ulcer and a history dating back twenty to thirty years.

Periodicity, that is, recurring spells of distress of one to six weeks' duration; and pain coming on several hours after eating and definitely relieved by a little light food, such as a glass of milk and an arrowroot biscuit, or by alkalies; are the cardinal features on which a diagnosis is made. Often a seasonal association of attacks is observed, many patients stating that they are more prone to spells in the spring and autumn. Belching of sour gas or pyrosis is common, although a great many do not complain of these symptoms. Night pain, or discomfort between two and four a.m., is fairly common. Patients often refer to their epigastric symptoms as a feeling of fullness or distress, an ache or soreness, or a hunger pain, and, as it is relieved by eating, they refer to it as a little indigestion and in many cases suffer in this way off and on for years, until more marked symptoms intervene and then by careful questioning the true history is obtained. When perforation is imminent or occurs, the pain is severe, and constant or cramp-like, and difficult to differentiate from gall-stone colic. Hæmorrhage occurs in about 20 per cent of cases, either in the vomitus or in the form of black, tarry stools, and, if severe, the symptoms characterizing hæmorrhage anywhere, such as shock, pallor, rapid, weak, thready pulse, restlessness, and sighing respiration, are to be noted. Ulcers which have persisted for a number of years often give evidence of obstruction, and there is more or less gastric retention due to scar formation and contraction of the duodenum, preventing the ready passage of food through the pylorus. Gastric retention is often noted when the ulcer is very active, or, again, where perforation is imminent.

Most cases of duodenal ulcer improve under medical management. Cases will often continue for years on little or no medical treatment, causing only moderate discomfort, and necessitating only a little care as to diet. These patients seem to suffer no great inconvenience and are quite able to perform their regular duties. In the last week I have had a case of this kind, with all the classical symptoms, such as periodicity, food relief, etc., and a well marked ulcer revealed on x-ray examination. The patient was surprised that his indigestion, which he could control by watching his diet more carefully, had as its origin a definite pathological condition. He belonged to a large family and said it was quite common for its different members to suffer from exactly the same type of indigestion. Let me remark here, lest we pay too little attention to these patients with a more or less comfortable type of complaint, that it was in three similar instances in the series of cases which I am reporting, that perforation occurred out of a blue sky and only emergency operations saved the patients' lives.

I have recently reviewed a series of one hundred and thirty-four cases of duodenal ulcer from the Clinic files. These were picked from a series of twelve thousand consecutive histories of patients coming under our attention for all manner of ailments, showing the incidence of duodenal ulcer, as seen here, to be about 1.3 per cent of all patients examined. However, I am sure that the true incidence is considerably higher than this, as there are numerous histories in the first half of the series that had to be discarded, owing to insufficient data recorded by the clinician on which to base a diagnosis, and the x-ray report being unsatisfactory and inconclusive. A man's opinion or interpretation may be wrong, but in my experience it increases efficiency to make up one's mind and put oneself on record. If wrong, facts will be more carefully assembled the next time. As these histories have been written by fifteen different doctors, it would seem that a review of the symptoms recorded would be more valuable than a similar series written by a gastro-enterologist.

The ratio of men to women was found to be just a little more than 2 to 1, there being 93 men and 41 women.

One hundred and twenty-eight gave a history of pain, or epigastric distress, or a hungry, gnawing sensation, coming on from one to four hours after eating and definitely relieved by a little food.

One hundred and twenty-four showed periodicity, that is, their distress occurring in spells of a few days to several months' duration, with intervals entirely free from symptoms.

The x-rays findings were definitely positive in one hundred and twenty cases. A diagnosis made in one case of both gastric and duodenal ulcer was confirmed by operation. Three were indeterminate, and the other eleven frankly negative, so far as x-ray findings were concerned.

One hundred and twenty-seven stated that the taking of alkalies, such as soda bicarbonate, would temporarily relieve their distress.

As far as one could judge from their history fifty-six were of a high-strung nervous temperament, and their work called for considerable nervous energy. Salesmen were much more numerous than all other classes put together.

Forty-nine of the series complained of distress or pain coming on in the early morning hours, waking them out of sleep, this in addition to the pain or distress suffered between meals during the day.

Forty-five patients had occasional vomiting spells.

Forty-one complained of having had severe epigastric pain during some of their spells, a small percentage requiring a hypodermic to control it.

Twenty-four had one or more hæmorrhages, either vomiting the blood or passing it by the bowel as black tarry stools.

A seasonal incidence of symptoms, either in the spring or autumn, was noted in twenty-four.

Twenty-two showed a retention of the barium, given as a motor meal, when examined under the screen five hours later, the retention varying from a grade I to a grade IV, on a basis of I, II, III and IV.

Thirty-nine had definite infection of their tonsils. Twenty showed infection of both teeth and tonsils. Thirty-three had dental sepsis alone. In every case we felt that it was useless to treat a case either medically or surgically unless all focal infection was cleared up. How urgent it is that focal infection be eradicated wherever possible before the patient develops any organic trouble!

Observation based on a large number of cases leads me to believe that operation is indicated only in those cases where the patient's distress unfits him for his duties or where there is a history of hæmorrhage, retention or symptoms of perforation. The others do well either on a strict Sippy or modified Sippy régime.

In selected cases gastro-enterostomy is one of the most satisfactory operations that a surgeon is called upon to perform. Unfortunately, many gastro-enterostomies fail to give the results which the patient and surgeon expect. In 95 per cent of these cases there can be no doubt that operation was either undertaken before the patient's symptoms called for surgical interference, or the operator's technique was at fault. Frequently, post-operative management for a sufficient length of time is neglected. A small percentage develop gastro-jejunal ulcer in the stoma of the gastro-enterostomy, and, while this is not nearly so common since the exclusive use of catgut as a suture material, a small percentage of patients seem to develop this condition. So far there seems to be no way of avoiding this most undesirable end-result.

At this clinic we have been ultra-conservative from a surgical standpoint. Operations were performed on only twenty-nine cases in this series. Forty-six patients had either hæmorrhage or obstruction, and three additional cases had perforation. Posterior gastro-enterostomy was performed in twenty-six cases. Two had excision of the ulcer alone, and one a pyloroplasty. Excision in our experience has not been very satisfactory, one of the cases requiring a gastro-enterostomy four months after the excision. The other case did not get as good results as were obtained by gastro-enterostomy.

Twenty-one cases had well marked adenomatous goitres as an associated condition. Fourteen had a history of chronic appendicitis. Five had cholecystitis, two, pulmonary tuberculosis, and one, lues.

The gastric analysis in eighty-two patients showed the combined acids to be fifty or over, and seventy-one showed the free hydrochloric acid to be 40 or over. None had achylia.

SUMMARY

1. Most cases of duodenal ulcer may be diagnosed by careful history-taking and gastric analysis.

2. X-ray by a skilled roentgenologist is invaluable.

3. A large percentage of cases do well on a strict Sippy or modified Sippy management.

4. Where the distress unfits a patient to perform his duties, or where there is a history of hæmorrhage obstruction, or signs of perforation, operation is the only safe procedure.

5. Operation should be undertaken only by a surgeon skilled in gastric surgery.

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SEROUS MENINGITIS

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THE diagnosis of serous meningitis is one that is made sufficiently often to justify some discussion of its merit, and an examination of the conditions that enter into its etiology. The term "meningism" is constantly coupled with that of "serous meningitis," and unless this condition is identified definitely and absolutely with a cerebro-spinal fluid normal in appearance, cytology and chemistry, we are at the start confused in the use of two different terms. Therefore, at the outset, in the course of these remarks, meningism will be characterized by a cerebro-spinal fluid normal in all points except that of increased pressure. This term was introduced by Dupré in 1894, and has been responsible for some confusion since, for some authorities still assert that "in some instances there may be twenty, thirty, or even more cells, but the fluid is clear, and no organisms are found." If this definition is accepted, we cannot differentiate serous meningitis from it. A "meningism" is properly the state in which a patient presents clinically the symptoms and signs of meningeal irritation, of variable intensity but in reality benign; and, on lumbar puncture, the cerebro-spinal fluid is found to be practically normal. Serous meningitis, on the other hand, has been associated with four different groups, or stages, of somewhat similar findings, but all of these manifest more or less distinctive changes in the cerebro-spinal fluid. This condition is identified with infection, toxæmia, or direct irritation after the intrathecal injection of sera, and such like. These result in a change in the secretion and absorption (one or both), local or general, of the cerebro-spinal fluid.

For the sake of classification, serous meningitis may be grouped under the following headings:—

1. The usual acute form, associated with alcoholism, anæmia, etc., and characterized by signs of coma and the cerebro-spinal fluid changes, of increased pressure, and increased globulin, but without change in the cytology or sugar-content. This is an uncommon condition in children and will be passed over at present.

2. The form of serous meningitis which is associated with the infectious fevers, and most typically seen with, or just following, measles, and usually presents changes in the pressure, cytology, and chemistry of the cerebro-spinal fluid.

3. Meningitis sympathetica. This is the form of serous meningitis that is of most interest to us to-day, as a clinical problem. In its true form it is but a defence phenomenon, and should be associated in one's mind with acute infection, with or without suppuration in the upper respiratory passages or their accessory sinuses; or it might result from the meningeal reactions around adenitis, deep cellulitis, thrombophlebitis outside the cranial cavity, or even brain-abscess. This condition is characterized clinically by symptoms and signs of meningitis; the cerebro-spinal fluid showing an increase in amount and in pressure, a slightly granular appearance, an increase in globulin content, an increase in cells (either lymphocytes or polymorphonuclears, or both), and a fluid which is culturally sterile.

4. Aseptic meningitis. This form is but the meningeal reaction which may result from the injection of sterile foreign substances (usually sera) into the subarachnoid space. Even stovaine is credited with producing this reaction. The cerebro-spinal fluid may be under great increase in tension, may be opalescent, or frankly purulent with marked cell changes, with polymorphonuclear cells predominating. Globulin is increased, but the sugar-reaction is not changed, and the fluid shows no signs of bacteria, either by smear or culture.

For the purpose of this paper, consideration will be given chiefly to that type of serous meningitis termed sympathetic meningitis, and my remarks will be limited mainly to a consideration of the changes in the cerebro-spinal fluid and their possible explanation. Before doing this, however, it might be wise to digress

sufficiently long to consider briefly such important points as the origin, circulation, and absorption of this fluid, the evidence available to-day suggesting that it varies in its normal and abnormal characteristics at different places in the same cerebro-spinal system, in the cytology of the normal cerebro-spinal fluid, and paths of possible infection.

It is somewhat generally accepted to-day that the cerebro-spinal fluid is the secretion of the choroid plexus of the lateral and fourth ventricles. With this, there is probably some small part of the fluid derived from the pericellular spaces, both of which directly communicate with the subarachnoid space. The flow of cerebro-spinal fluid is from the pericellular and perivascular spaces into the subarachnoid space. The circulation of the cerebro-spinal fluid, after it has escaped from the ventricular system, is not well known. It is probably renewed in its entirety every four hours, and this means a daily secretion of from six to seven hundred cubic centimetres. In 1919, Dandy placed indian ink in the ventricles; it first filtered into the cisternæ; then the subarachnoid spaces of the cerebellum filled, and the fluid spread outward and upward into the sulci of the hemispheres. In forty-five to seventy-five minutes it reached the more remote parts of the longitudinal sinus. Phenolsulphonephthalein is absorbed and excreted much faster than this, so it may not be that the only main channel of absorption is through the arachnoidal villi into the large venous channels, as is the accepted teaching to-day. It may be that a great deal of absorption of the cerebro-spinal fluid takes place in the tissue of the perivascular spaces. There are also significant data pointing to there being some downward circulation of the cerebro-spinal fluid in the spinal canal, for, in 1921, Weigeldt found in many fluids examined that albumin and cells progressively increased from the cervical to the lumbar region. It is also well established that the ventricular fluid may be colourless and the spinal fluid bile-stained in icterus; in paresis negative Wassermann reactions have been obtained in the ventricular fluid and positive reactions in the spinal fluid in the same group of cases. Ayer and Solomon (*The Human Cerebro-Spinal Fluid*) state that, in normal cerebro-spinal fluid, the pressure is similar in the ventricles, cisternæ, and lumbar sac, *i.e.*, the height of the fluid columns in the manometers is on the same horizontal plane; the fluids are uniformly clear and colourless and do not clot; and cells are absent in the ventricle, although frequently a few are found in cisternal and lumbar fluids, under what must be considered normal conditions. The Wassermann and colloidal tests, gold chloride, benzoin, and mastic, are uniformly negative.

"While globulin (ammonium sulphate ring test) is normally absent in all three fluids, slight but constant differences are seen in the total protein-content, as indicated by trichloracetic acid and sulphosalicylic acid tests, the greatest amount appearing in lumbar, less in cisternal, and the least in ventricular fluids. While the normal figures vary, 30 mgm. per 100 c.c. in lumbar, 25 in cisternal, and 10 in ventricular fluids, would be considered as the normal ratio. Conspicuous is the opposite ratio in regard to sugar-content. Sugar is

TABLE I
COMPARATIVE FLUID EXAMINATIONS FROM VENTRICLE AND LUMBAR SAC IN CASES OF GENERAL PARESIS*

	Wassermann reaction	*Cells*	*Globulin*	*Total protein*
C. M.				
Lumbar	Pos. 0.05 c.c.	45	+	++
Ventricle	Neg. 1.0 c.c.	30	0	Normal
Lumbar	Pos. 0.05 c.c.	14	++	++
Ventricle	Neg. 1.0 c.c.	2	+	+
Lumbar	Pos. 0.05 c.c.	10	+	+
Ventricle	Neg. 1.0 c.c.	6	0	Normal
S. G.				
Lumbar	Pos. 0.8 c.c.	2	+	+
Ventricle	Neg. 1.0 c.c.	2	0	Normal
E. C.				
Lumbar	Pos. 0.05 c.c.	..	...	....
Ventricle	Pos. 0.8 c.c.	..	...	
A. G.				
Lumbar	Pos. 0.2 c.c.	2	++	+
Ventricle	Neg. 1.0 c.c.	0	0	Normal
A. F.				
Lumbar	Pos. 0.3 c.c.	0	++	+
Ventricle	Pos. 0.3 c.c.	1	+	+
Lumbar	Pos. 0.1 c.c.	5	+++	++
Ventricle	Pos. 0.1 c.c.	3	+	+
Lumbar	Pos. 0.3 c.c.	6	++	++
Ventricle	Pos. 0.3 c.c.	0	+	+
H. P.				
Lumbar	Pos. 0.6 c.c.	18	++	+++
Ventricle	Neg. 1.0 c.c.	2	+	+
Lumbar	Pos. 0.2 c.c.	27	++	++
Ventricle	Neg. 1.0 c.c.	7	+	Normal
Lumbar	Pos. 0.2 c.c.	39	+++	+++
Ventricle	Neg. 1.0 c.c.	0	+	+
Lumbar	Pos. 0.2 c.c.	32	++++	+++
Ventricle	Neg. 1.0 c.c.	2	0	Normal
Lumbar	Positive	13	++	+++
Cistern	Positive	18	++	+++

* Table from *The Human Cerebro-Spinal Fluid.*

greatest in amount in the ventricular fluid (approximately .08 per cent) and least in the lumbar sac (averaging about .06 per cent), the cisternal fluid showing a value between these two."

The table below shows in a convenient form, in connection with a well-defined pathological state, figures for certain of the features referred to, compared according to location.

It is thus evident that increase of cells and globulin is more characteristic of extra-ventricular fluid, that is, the only really normal cerebro-spinal fluid is that found near its source, namely, in the ventricles. The number of cells in normal cerebro-spinal fluid is variously given by different authorities. Levinson gives four to six cells per cubic millimeter, all being small lymphocytes. Fontecilla and Sepulveda, and several other authorities, state that normal fluid contains few if any cells, and put one per cubic millimeter as the maximum, and consider that more than one is indicative of inflammatory reactions. The origin of these cells, under normal conditions, is not known. It is thought that they wander from the blood and pass through the walls of the choroid plexus. But that is not the only source, for in apparently healthy fluids more cells are found in the cisternæ and lumbar sac than in the ventricles. Under abnormal conditions, however, there is no doubt that cells come directly from the vessels into the perivascular spaces, as seen in encephalitis, poliomyelitis, tetanus, etc. Another very significant portal of entry for irritative substances is through the perineural lymphatics of the afferent and efferent cerebral and spinal nerves.

Orr and Rows (*Brain*, xxxvi, 271), in an exhaustive paper, conclude that: "The precise origin of the cells composing an inflammatory reaction is always a matter of great difficulty, and some points must remain obscure, but a consideration of the mechanism by which the inflammation is produced should prove of very great assistance, especially in the case of lymphogenous infections. In experimental lymphogenous infection of the spinal cord of a subacute nature, in which all the inflammatory phenomena are extravascular, and the path of the toxic lymph can be traced accurately, we find that besides the proliferation of the connective tissue in the meninges the only structures which react are the adventitial cells of the veins and capillaries and the neuroglia cells immediately in contact with them. The adventitia takes an extremely important part in the production of the cells of reaction; this is not surprising, seeing that the cerebro-spinal lymph flows directly into its spaces. Hence, when a toxin gains the central nervous system by the lymph path the cells of the adventitial sheath are the part of the vessel to be first attacked; and should the irritant be weak or permeate the tissues slowly no other phenomena need occur for some time. In more acute conditions, however, not only is there a more intense reaction in the tissues already mentioned, but the endothelial cells join in the process; and with a still greater degree of potency in the infection, intravascular changes, such as hæmorrhage and thrombosis, complicate the picture."

In serous meningitis, as in many forms of meningitis, it is not definitely known by what route infection gains access to the central nervous system. If the infection is central and becomes free in the cerebro-spinal fluid, we no longer are dealing with serous meningitis. Conditions have advanced past a defensive phenomenon which might be comparable with a sterile serous effusion into the synovial sac of the knee in the presence of a general or local infection in a lower limb.

A point to stress is that in the clinical condition known as serous meningitis, the outlook and the sequelæ are much more favourable than the onset of clinical signs and the cerebro-spinal fluid findings would lead one to suppose. We do not know whether these toxins (or infections) reach the central nervous system by the lymphatics, the perineural spaces, or the blood vessels. It is possible that the toxin (or infection) may become centralized by way of these routes, and when an acute clinical meningitis, amicrobic by direct smear and by culture, occurs concurrently with an acute febrile state (especially with infection in the upper respiratory tract, ears, sinuses, etc.) we may be dealing solely with a normal defence reaction of the meninges, which does not necessarily constitute a basis for serious apprehension. Many clinical conditions are known to give rise to cytological and chemical changes in the cerebro-spinal fluid. From this general group bacteriological examination often proves

definitely a known infection. In a large number the clinical history and concurrent systemic symptoms and signs point the way to a differential diagnosis in a definite proportion, as in poliomyelitis, tetanus, tuberculosis, etc., and, for the remainder, we are still left with the diagnosis of a condition for which we use the term "serous meningitis." Table II gives an analysis, from the present standpoint, of twenty-four cases of serous meningitis of which I have notes.

TABLE II

SEROUS MENINGITIS—24 CASES

Age: 12 were 5 years or under
9 were 6 years to 10 years
3 were over 10 years.

Sex: 20 males—4 females.

Area of infection:

Otitis media	12
Pharyngitis	6
Tonsillitis	5
Adenitis	2
Rhinitis	1
Fractured skull	5
Bronchopneumonia	3
Septicæmia	2
Cellulitis of cheek	1

Season:

Winter	5
Spring	8
Summer	7
Autumn	4

Results:

Cured	13
Improved	3
Died	6
From septicæmia	2
Otitis media and bronchopneumonia	2
Otitis media, rickets, decomposition	1
Otitis media (died soon after admission; no lumbar puncture reported)	1

C. S. fluid findings:
Highest cell count, 7000.
Lowest cell count, 11 per c.mm.

Average cell count in 21 cases:
778 cells per c.mm.
Lymphocytes predominated in 70.6 per cent of cases.
Polymorphonuclear leucocytes predominated in 29. 4 per cent of cases.

The following is a typical example of the affection:—

Case D.A.H. Male, aged 5 years; admitted to hospital December 19, 1921.

Family history: excellent. *Previous history*: chickenpox, 1917; measles, 1919; appendicitis, 1920; tonsillitis, recurring attacks.

Present illness: six days ago he had a head-cold. Five days ago he had earache for one night. One ear was congested. Eighteen hours ago frontal and occipital headache began. Temperature 99.6°. A very restless night followed; pain in the back was complained of and he said it hurt his head to sit up. Slight twitching of arms and legs was noticed.

Condition on admission: December 19, 1921. Temperature 106.8°; pulse 140; respiration 28. White blood cells, 9200; 86 per cent were polymorphonuclear. The ears appeared normal; the tonsils were slightly congested, and there was a slight cervical adenitis. Kernig and Brudzinski signs were positive. The child was irritable and hypersensitive to examination. The optic discs were normal.

Cerebro-spinal fluid, 10 a.m. (before admission); pressure +; just cloudy; 1000 cells per c.mm.; globulin +; polymorphunclear cells, 76 per cent, lymphocytes 24 per cent. A few hours later: pressure +; faintly cloudy; 650 cells; globulin +; polymorphonuclears 82 per cent, lymphocytes 18 per cent. Forty c.c. of antimeningococcic serum were given intravenously; smear, negative; urine, normal.

December 20th. Temperature 101.4°; pulse 130; respiration 32. He vomited immediately after taking food; was less irritable; slept more. The ear drums were dull in appearance; cervical adenitis was present. Cerebro-spinal fluid: pressure +; faintly cloudy; 750 cells; globulin +; polymorphonuclears 75 per cent; lymphocytes 25 per cent. Twenty c.c. of antimeningococcic serum were given intraspinously. Tuberculin tests were negative; smears, negative; cultures, sterile.

December 21st. Temperature 101.4°; pulse 148; respiration 36. White blood cells, 7600; 76 per cent polymorphonuclears; 24 per cent lymphocytes. Head retraction; general improvement. Cultures were sterile.

December 22nd. Temperature 100°; pulse 100; respiration 28. Improving generally. Twenty c.c. of antimeningitic serum given intraspinously. Cerebro-spinal fluid: pressure +; very faintly cloudy; 155 cells; globulin +; polymorphonuclears 52 per cent; lymphocytes 48 per cent.

December 23rd. Temperature 100°; pulse 118; respiration 28. White blood cells, 7400, 56 per cent polymorphonuclears, 44 per cent lymphocytes; resting more quietly; rigidity of neck still; also marked Kernig sign.

December 25th. Temperature 100.4°; pulse 116; respiration 24; improving; cultures sterile (cerebro-spinal fluid and blood).

December 27th. Temperature 102.4°; pulse 128; respiration 32. Much more irritable; head retraction, and Kernig marked. Cervical adenitis, especially left side marked. Ear drums "dull."

December 28th. Temperature 100.4°; pulse 110; respiration 28; definite adenitis, especially of the posterior chain on the left side. Discs normal. General condition more satisfactory.

December 30th. Temperature 99.2°; pulse 108; respiration 28; discharged to go home. General condition fair. Local condition in ears doubtful, but deep glands of the neck, especially below the left mastoid and the posterior chain, very definitely enlarged; these were opened about one week later (streptococcus hæmolyticus recovered in pure culture). A deep cellulitis developed, and later erysipelas to clavicles.

January 1, 1922. Transfused. After this he developed an acute otitis media in one ear; in 24 hours he developed it in the other ear (both opened). From then on he has made a slow but good recovery. He has remained well since.

I have intentionally evaded any detailed enumeration of clinical symptoms and signs, but have preferred rather to leave these in the abstract by the use of the term "meningeal irritation," and to devote this brief discussion to the points of greatest diagnostic importance, namely, the relationship to the primary focus and the differential diagnosis after careful detailed examination of the cerebro-spinal fluid. My remarks as to treatment are very brief, for I feel that only two methods are worthy of consideration, namely, efforts to relieve the general

or local causative condition, and, secondarily, the probable efficacy of repeated lumbar puncture for the purpose of drainage. This latter procedure is not without possible danger, however, for it is reasonable to expect that too frequent, or too complete, drainage might tend to spread an otherwise localizing meningeal condition.

IDIOPATHIC HÆMORRHAGE OF THE NEW-BORN*

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WHAT is the cause of "idiopathic hæmorrhage of the new-born?" Is it due to an infection? Is it brought about by the lack of certain constituents of the blood? Is it caused by a temporary deficiency of vitamine B in the blood of the infant? Or, shall we ever know the underlying etiological factors of this disease?

Idiopathic hæmorrhage of the new-born is a term used to designate a condition or disease in infants which manifests itself shortly after birth by spontaneous bleeding, and in which no birth-injury, other trauma, or other forms of disease have acted as causative factors.

We can conveniently divide all cases of hæmorrhage of the new-born into two groups:—

1. *Primary,* (also called "idiopathic.")
2. *Secondary,* associated with—
   (a) Trauma.
   (b) Infections.
   (3) Syphilis.

In this paper it is the primary variety that I wish to discuss, as "hæmorrhage of the new-born" *in toto* is by far too extensive a subject for the allotted time.

PATHOLOGY

Unfortunately the pathology throws but little light on the subject. All that we can find is hæmorrhage, and, from autopsies we can do little more than classify the areas or organs showing the presence of blood, and find the parts most often affected.

Hæmorrhagic areas may be found in the mucous membrane of the stomach and of the intestine; ecchymoses may be found in the skin, often diffuse; signs of bleeding may be also discovered in the pericardium, peritoneum, in the serosa of the lungs, and in any of the internal organs. Intracranial hæmorrhage is usually subdural and may cover any part of the brain or extend into the spinal cord. Moynihan points out a very definite relationship between duodenal ulcer and melæna neonatorum, and found ulcers in sixteen typical cases of this disease. Infection, necrosis, and thrombosis of the small vessels in the duodenal wall are given as causes for these ulcers. However, as melæna neonatorum usually shows a rapid and uneventful convalescence, it is hard to conceive that many cases have definite duodenal ulcer, or that the ulcer is similar to that found in the duodenum of the adult. When extensive hæmorrhage occurs intracranially most pathologists consider this to be the direct cause of death; and Green states that extensive subdural bleeding may occur, either from trauma alone, or in association with hæmorrhage of the new-born.

OCCURRENCE AND DIAGNOSIS

Morbus hæmorrhagica neonatorum is a rare disease, occurring in about 1 per cent of all births. The idiopathic variety is, of course, even rarer. Townsend[3] judges it to be about one-quarter of one per cent, and states that he has found it to be more common in institutions than in private practice. Many observers state that the incidence of the disease increases when epidemics of sepsis occur in hospitals, but Holt has investigated this question carefully, and declares that he has found no increase among the cases of primary hæmorrhage under such circumstances.

The clinical picture of this disease is definite and easy to recognize. Medical advice is usually sought very early for the child in this condition,

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be it from private physician or hospital, as no sign so rouses the parents as hæmorrhage, whether melæna, hæmatemesis, or epistaxis. The disease tends to occur in the first week of life, usually on the third or fourth days. In the records at the Hospital for Sick Children, Toronto, the majority were found to commence on the fourth day; many on the third and fifth days; and a few even within several hours of birth. It is very rare to find the disease commencing after the twelfth day.

The most characteristic feature of this disease is spontaneous bleeding which is very persistent, in spite of the usual treatment for hæmorrhage, and tends to be multiple in origin. Townsend,[3] of Boston, who is the recognized authority on this disease, states that in fifty cases he has found bleeding from these sources in the following order of frequency: skin and subcutaneous areas, intestine, navel, and stomach; and that the remaining areas, mentioned above, are relatively rarely involved. Other observers do not precisely agree with these observations, but all tend to give the skin the first place, the gastro-intestinal tract second place, and all stress the occurrence of melæna.

This condition resembles an acute infectious disease, in that it has a definite age-incidence, even of days; that it runs a rapid self-limiting course; that it never recurs; and that it responds favourably to a specific treatment. Within a few days after the disease develops the child is either dead, or has completely recovered. Bleeding may be very free or slight, or may consist of slight but persistent oozing from the umbilicus or from stitch wounds. The child may become exsanguinated and die before the disease checks itself. Hæmatomata may occur almost anywhere, and tend to appear over areas which have been exposed to pressure or trauma. Those of the scalp are common and must be differentiated from caput succedaneum. The hæmatomata are softer than the latter, gradually increase in size as bleeding continues, and show a definite purplish hue imparted to the skin from the blood beneath.

In addition to signs of hæmorrhage, we find increasing evidence of a secondary anæmia, which may become very severe. Sometimes the temperature is slightly elevated, but it may be subnormal. The child is restless and fretful at first; later, it may become prostrated and comatose. Melæna should not be confused with expulsion of the meconium; the latter usually shows no red blood cells microscopically, and leaves no red halo on the diaper.

Hæmorrhagic disease of the new-born should not be confused with hæmophilia. Hæmophilia rarely manifests itself until the infant is one year old, whereas the former always occurs in the first few days of life. Hæmophilia is a hereditary disease, transmitted by the females of a family, manifesting itself in the male members only, and continuing all through the patient's life. Morbus hæmorrhagica neonatorum occurs equally in the sexes and is limited by days, does not recur, and is not, so far as we know, hereditary.

Blood Picture

There has been but little research on the blood in this disease, except by Whipple.[11] As regards the cellular constituents and the hæmoglobin, little abnormality is found, except that observed in a secondary anæmia due to blood loss. In the cases mentioned above from this hospital, the red blood counts averaged about 3,200,000 per cm.; the white counts, about 16,000 per cm.; but the differential count showed nothing out of the ordinary. This was before any treatment or transfusion. After transfusion, on a basis of 15 c.c. of blood per pound body weight of the infant, the red count was raised about 1,200,000 per cm., and in cases which recovered the count steadily rose for the next few following days. It might be advisable to mention here that in normal infants there is quite an extensive destruction of red blood cells in the first week of life, the red count often dropping as much as 1,000,000 per cm. The hæmoglobin usually drops about 10 per cent, and the leucocytes from 20,000 to 10,000 per cm. This post-natal blood destruction will be discussed later when we deal with the etiology.

In hæmophilia, according to accurate workers, there is never a decrease in the number of platelets, and in this condition we usually find the platelets normal in number and also in appearance. We do, however, find some delay in the rouleaux formation of the red cells. In hæmophilia we find both the clotting and bleeding times increased; the clotting time may be well over an hour, and is seldom less than twenty minutes. In morbus hæmorrhagica neonatorum

the clotting time is usually slightly increased, and the bleeding time always increased, relatively more so than in hæmophilia.

During the first few days of life there is frequently a condition in infants which favours hæmorrhage. Most infants may be said to show some degree of this, and it may be associated in some way with the post-natal blood destruction. The coagulation and bleeding times are frequently found slightly prolonged in normal infants for their first few days of life. The normal bleeding time is two to five minutes, and the normal coagulation time is about seven minutes. The coagulation time may be prolonged to even twenty or thirty minutes, and no spontaneous hæmorrhage occur; but if, with this, the bleeding time be increased even slightly, hæmorrhage is almost sure to begin. And again, if the coagulation time be only slightly increased, and the bleeding time be prolonged at all, signs of hæmorrhage are likely to appear. In the cases quoted above, 85 per cent of them showed the bleeding time to be increased about twice that of the clotting time; the former and latter averaging about sixteen and eight minutes respectively. Some cases, however, showed clotting and bleeding times which were approximately normal.

PROGNOSIS AND TREATMENT

The recognized treatment to-day for this disease is blood transfusion. The amount of blood supplied should be 15 c.c. per pound of body weight of the infant, and the donor should be of the same Jansky group as the child. This treatment not only supplies the lacking constituents of the blood to the child, but replaces blood lost by hæmorrhage. Some clinicians, as Schloss and Commiskey,[12] advocate the repeated injections of whole ungrouped human blood into various subcutaneous areas of the child in amounts varying from 20 to 40 c.c., until the bleeding is checked. However, they advise transfusion for all severe cases, particularly if the case shows any degree of exsanguination. Others have used human and horse serums subcutaneously, with apparently very satisfactory results. Agents such as adrenalin, calcium salts, and iron preparations, can be dismissed as practically useless in this condition. Other measures of treatment are rest, warmth, and proper feeding. The hæmorrhage should be checked as well as possible, and the cautery has been resorted to in some very obstinate cases.

The prognosis is usually quite favourable if the child be not exsanguinated, or if there are no complications from the hæmorrhage, such as marked intracranial bleeding. Most children are brought to the hospital early, and they are immediately transfused. Usually the bleeding stops within a very few hours, and the average stay of these patients is only three days. Once checked, especially by transfusion, the oozing does not tend to recur, and never recurs after two weeks have passed. Before blood was used as a therapeutic measure, either intravenously or subcutaneously, the mortality was about 68 per cent according to Townsend.[3] Now, we have good reason to believe that the mortality is reduced to less than 20 per cent in straight uncomplicated cases. Therefore, the prognosis depends on the treatment itself; on the promptness with which the child is treated; on the degree of exsanguination; and on the complications. In the hospital records most of the deaths were due to intracranial hæmorrhage associated with the disease.

ETIOLOGY

The exact cause of this disease has not yet been determined. That the disease is due to the same cause in every case is agreed upon. That is, certain factors do not tend to bring about the disease in one infant, and different factors in other children. When blood leaks abnormally from vessels it is due either to changes in the blood or to changes in the walls of the vessels. Most observers agree that the bleeding is not due to pathological changes in the vessel-walls, for two very good reasons: firstly, that lesions have never been found in post mortem examination of these vessels; and, secondly, that it is very difficult to conceive of a lesion of the vessels so widespread in character being immediately corrected by blood or serum injection. The condition is probably due to a primary blood-defect, because of the abrupt change from a fatal illness to perfect health within a very few days or even hours. The disease is intimately associated with clotting, so let us base our reasoning on Howell's theory of blood clotting.

Howell states that in normal blood there are four main constituents: namely, fibrinogen,

prothrombin, antithrombin, and calcium salts. The antithrombin tends to hold the prothrombin in a delicate combination, and can also prevent thrombin from converting fibrinogen into fibrin. Therefore, if the antithrombin gain supremacy over the prothrombin we have bleeding, and Whipple[11] has fairly well proved this to be the cause of bleeding in the various purpuras and in the leukæmias. But, if the prothrombin should be much in excess of the antithrombin we should have a spontaneous thrombosis throughout the body. The calcium acts to convert the prothrombin into thrombin. Most of the prothrombin comes from the blood platelets, but some also comes from the leucocytes, as clotting can be brought about in the complete absence of platelets.

Whipple[11] has done much work on the etiology of this disease, and gives his view, based on much exact observation, that the causative factor is a lack or decrease in the prothrombin of the infant's blood. He also states that the therapeutic measure of transfusion or of injection of blood or serum subcutaneously adds prothrombin to the patient's blood, either in amounts large enough to overcome the excess antithrombin or to stimulate the formation of prothrombin. This latter view seems more likely, as it usually takes a few hours before bleeding is checked. Therefore, it can be seen why calcium has no effect; because there is no prothrombin for it to act upon. Whipple[11] also states that the prothrombin factor of the blood is very seldom involved in disease, and that this change is almost specific for hæmorrhagica neonatorum. Now that Whipple has fairly conclusively shown that the exciting cause of the condition is lack of prothrombin, can we find out why the latter is reduced? Is it possible that the lack of prothrombin is caused by a decrease in the vitamine B content of the blood,—to an avitaminosis?

Moore and Brodie,[5] in a recent paper, based on some very interesting and careful work done last summer, put forth the theory that this disease is caused by lack of vitamine B in the mother and infant. They found that in giving rats a diet, normal except for a limitation in vitamine B, that the new-born rats tended to show hæmorrhage, and that there was much hæmorrhage at their birth, from the mother rat. They also record very thoroughly a human case in which the mother was found to have been living on a diet very restricted in vitamine B. There was much vomiting throughout pregnancy and much hæmorrhage at delivery. On the fourth day the baby developed morbus hæmorrhagica neonatorum, and the clotting and bleeding time were both moderately prolonged. When the child was brought to the hospital it was seriously ill, and was fed yeast and orange-juice, and this form of treatment benefited it considerably. In certain cases of this disease, where death had occurred, they have found certain conditions in the infant resembling those found in victims of beri-beri, which is caused by lack of vitamine B. They claim that the beneficial results obtained from the injection of blood is due to the action of the vitamines supplied—vitamine B principally. Summing up their findings we have the following facts:—

1. Avitaminosis in animals causes hæmorrhage in the new born.

2. Human cases of this disease show post mortem changes resembling beri-beri, such as myelin degeneration of certain nerves.

3. The mother's diet was deficient in vitamine B in a case of hæmorrhage of the new-born.

4. Vitamine B improved the condition in the infant when supplied early in the disease.

Koessler and Maurer,[15] of Chicago, have presented two papers during the past year in which they point out a definite relationship between diets deficient in vitamines and pernicious anæmia. They tend to place the responsibility for the neurological changes found in this disease on the lack of vitamine B. And, as you know, there is a tendency for hæmorrhage in primary anæmia. The advantageous effect of concentrated liver feeding, so recently advanced by Minot and Murphy,[4] they claim, is due to the large supply to the patient of vitamines which are found in normal liver. Therefore, if the exciting cause of the bleeding be due to lack of prothrombin, may the lack of vitamine B not have something to do with this shortage?

Brown and Tisdall[1] have recently shown that the ultra-violet rays of the sun tend to conserve vitamine A. They also show a definite seasonal incidence of the sun's ultra-violet rays. The ultra-violet light increases noticeably about

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the first of March, decreases about the first of October, and is very slight in December, January and February. On tracing the incidence of morbus hæmorrhagica neonatorum in the records of the Hospital for Sick Children for some years, it is found that there is a definite increase in the number of cases beginning about October the first, reaching a maximum in January, falling rapidly about the first of April, and remaining low throughout the summer. Could this not have some connection with the ultra-violet light from the sun? It has never been proved that the ultra-violet light has any beneficial effects on the vitamine B content of the blood, but any factor that improves or conserves one vitamine is thought to improve or conserve the others, as the vitamines are all intimately associated.

In addition to this, Sandford,[6] of Chicago, has very recently shown that exposure of normal infants to the quartz light will decrease the bleeding time, will temporarily increase the number of platelets, but does not lengthen the coagulation time. Sooy and Moise[9] have also recently shown that quartz light is useful in the treatment of idiopathic purpura hæmorrhagica and tends to shorten the bleeding time. They also state that they believe it to be useful in morbus hæmorrhagica neonatorum.

SUMMARY

In morbus hæmorrhagica neonatorum we know that there is a lack of prothrombin in the blood, and that a shortage of the vitamine B in the mother and child tends to induce hæmorrhage.

We also know that ultra-violet light tends to shorten the bleeding time and to check this disease, and that the greatest incidence of this disease is when the ultra-violet rays of the sun are scarcest; and that ultra-violet light tends to conserve at least one vitamine. Therefore, it is quite possible that the lack of prothrombin is brought about by lack of vitamine B in the infant's blood, as shown by the various factors discussed above.

Many other etiological factors have been advanced in this disease, such as infection, trauma, intoxication, or partial asphyxia at birth. But none of these are seriously considered, and they do not explain the rapid sudden improvement following the injection of blood. However, there is much work yet to be done before we will be able to state definitely the cause of this condition.

In closing allow me to say that idiopathic hæmorrhage of the new-born is a definite clinical entity, found only in the first few days of life, self-limiting in character, responding well to transfusion, of unknown etiology, and very evidently, according to our statistics, a disease of this particular season of the year.

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The practical importance of differentiating workers with a lead line in the gums who are actively absorbing lead at the time the lead line is observed from those who merely have inert deposits of lead in their gums from some previous time cannot be over-emphasized. To properly appraise the diagnostic significance of the lead line in any particular case it would seem to be essential that laboratory analyses be made both of blood and urine for evidences of active lead absorption. It is the presence or absence of active lead absorption, and not the presence or absence of the lead line, which is essential to a proper interpretation of the symptom-complex presented by a given patient. It must be remembered, however, that every worker who has any lead stored in his body—whether in his gums, his bones, or elsewhere—is at all times a potential case of acute lead poisoning.—May R. Mayers, *Industrial Hygiene Bulletin*, New York.

THE NERVOUS CHILD*

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THE truth of the adage that "Ontogeny recapitulates philogeny" is well illustrated by the picture presented by the new-born babe. At this time he still retains vestiges of the untamed animal, notably that furry covering lanugo and his "simian" grip. Both of these disappear, but more important and lasting are the mental vestiges—fear, anger, and love. These, if not treated with the utmost respect and care, constitute a direct menace to his future welfare and happiness. It is true that all the neuroses of infancy and childhood are not due to these causes. Heredity, environment, an innate negativism, and tremendous suggestibility, all play a part in his mental troubles, and any or all of these may be accentuated by a poor physical condition, induced by malnourishment or disease. However, fear, anger, and love do play a not inconsiderable part in the very beginning of neuroses.

Fear, at first merely the apprehension of loss of support or shock due to sudden loud noises, may become magnified by mismanagement, and result in phobias and hysterical manifestations. Anger in the new-born, due chiefly to being held in some awkward or rigid position, may produce "tantrums." Love, in this case purely physical, as differentiated from the romantic type which is a development of much later childhood, is responsible for neuroses of a sexual nature, of which the chief is masturbation.

Tantrums may vary from mere weeping spells to acute outbursts of rage, with an attempt to do bodily harm. The first tantrum may occur shortly after birth, while the infant is being held for dressing, washing, or examination purposes. As the child grows older, the condition tends to become worse. He discovers the power of noise and tears over his immediate surroundings, and uses it to coerce his family. Later his friends and playmates suffer from it. Advancing in years, he uses it to cover inadequacies in his nature. A moody, depressed, attitude sometimes follows. A case illustrative of this type was noticed at one of our government reformatories. A young girl, undergoing a disciplinary régime, smashed the windows and attempted to demolish a whole room with an axe. When she was removed to a hospital, where she had constant nursing attention, she became depressed and the "*smashing*" desire was replaced by a desire for self-mutilation and suicide. Other cases develop more criminal tendencies. In one, a girl of fourteen, who had had tantrums for years in an attempt to get greater indulgence from her parents, finally started fires on two different occasions; one in such a way that it might have resulted in the death of a sister of whom the child was jealous.

In the state of our present knowledge, crude as it is, we are called upon and must treat these cases as they are presented to us. The whole environment and personality of the child must be studied. Very often a small maladjustment to surroundings is at the seat of the trouble, and the simple removal of the child to another and more favourable environment is enough to bring about improvement. In early infancy, when sensory stimuli are the only arguments recognized by the child, a cold bath during the course of one or more attacks is sometimes sufficient to clear up the condition. At the same time, an effort should be made to discover the underlying cause of the outbursts.

Probably the commonest complaint to be heard in the pædiatrist's office is, "Doctor, I can't get her to eat a thing." Sometimes this is enlarged by the assertion that "she vomits if I try to make her." As a rule it is a nervous unstable mother who expects the doctor to prescribe a tonic—"something to give the child an appetite," little realizing that it is her own fretful solicitude that constitutes nine-tenths of the trouble. Extreme suggestibility, coupled with a tendency to negativism, is the basis of

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this neurosis. At some time, this child has probably lacked appetite from any one of many possible causes. The anxious mother tries to coax her to eat; failing in this, to make matters worse, she may try to force her. The child becomes stubborn, notes the worry of the parent, and secretly enjoys it. She also feels that for once she is occupying the centre of the stage, and finding this agreeable, she consciously, or unconsciously, decides to repeat the performance. By constant repetition her attitude becomes exaggerated. Eventually, her physical condition suffers, thus opening the path to other and more serious neuroses.

The treatment of this and allied conditions lies chiefly in a complete change of attitude toward the child. "Dont's" and orders should be used sparingly. An offhand and often uninterested attitude toward all the child's activities should be cultivated. A little praise now and then is of value, but this should not be overdone. Under this management, negativism becomes less marked, the appetite picks up, and the general condition improves. Refusal to eat is not always due to this cause and in many cases a pathological condition lies at the bottom of the affair. Each case must be carefully investigated and treated on its own merits.

Mention must also be made of that almost indescribable entity—the purely nervous child showing no specific, clear-cut disability. This child is abnormally sensitive from birth, cries readily, is disturbed by sounds and lights. His underclothing itches. He is a poor sleeper. The family develops that "hush-hush" attitude, which naturally upsets the nerves of the whole household, this in turn reacting on the child. Growing older, he is either quarrelsome with his playmates, seeks seclusion, or clings to the company of his parents. For a child with a normal nervous system, a constant parental companionship is bad. How much more so must it be for this already impaired nervous unit? His emotional life is overdeveloped. Love and hate, joy and grief, fear and anger, are easily aroused in him. Intellectually, he is usually bright. This results in a rapid school advancement, even beyond the limits of his physical endurance. Tiring easily, these children are often so worked up at night by the events of the day that they obtain sleep with difficulty. In the morning they are not refreshed, and are apt to be irritable and peevish during the early hours. Owing to the solicitous attitude of others, the child becomes acutely aware that he is different to other children, and very often feeling his own weakness he exploits his condition, making it an excuse to shirk duties and unpleasant experiences, which in themselves are of value in developing to the full the more stable individual. Under proper management this attitude may be overcome. There are however other nervous phenomena which, fastening themselves upon the child, are much harder to dislodge. I refer to phobias, hysterias, and speech disorders.

In considering the treatment of these nervous disorders we encounter tremendous obstacles and not the least of these is our abyssmal ignorance of what might be termed the physiological behaviour of the perfectly normal infant. At the present time this subject is receiving a great deal of attention from psychologists, and it does not seem too much to hope that, in the near future, material will be available that will be of distinct value in the treatment and prevention of these nervous disorders. In the meantime, we can teach regularity for both mother and babe. The child should be nursed, bathed, etc., at regular intervals. The mother should adopt a routine that will keep her own nerves from getting "on edge." The babe should be raised quietly, undisturbed by numerous admiring relatives and friends. He should receive a fair share of mothering, but should not be used as a plaything. Undue "fussiness" on the part of the mother should be discouraged. Long journeys and visits should not be undertaken during the first year of life. As he grows older, he should partake of healthy play to the point of fatigue. He will then sleep well at night. He should have the companionship of other children of his own age and in this way learn his own powers and limitations. Organizations such as Cubs, Boy Scouts, Girl Guides, etc., are splendid antidotes for nervousness in childhood. Medical supervision directed toward the prevention of those nerve-destroying conditions, rickets and chorea, is of value. Graduated sun-baths, the prevention or removal of foci of infection, and above all an adequate and well cooked diet, will provide a sturdy body in which will dwell a normal mind.

A CASE OF DIABETES MELLITUS THAT BECAME ONE OF ATYPICAL RENAL GLYCOSURIA*

BY EDWARD H. MASON, M.D.

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THE occurrence of renal glycosuria or a low glucose threshold in the kidney, associated in the same case with the typical findings of diabetes mellitus, has been reported by several observers. Several such cases have been followed in this clinic.

A case presenting the typical findings of true diabetes mellitus, which upon a subsequent admission was found to be one of atypical renal glycosuria only, has to the best of my knowledge not been reported. That such a change may occur justifies the following report.

CASE HISTORY

R. M., a Jewish female of 68 years, was admitted to the Royal Victoria Hospital, April 5, 1924. (Case No. 741 metabolism). She complained of sugar in her urine, thirst, and frequency, shortness of breath and palpitation, as well as swelling of her feet, cough and blindness.

Present Illness. — Twenty years previously thirst and frequency developed, the urine was examined and glycosuria was found. With a slightly restricted carbohydrate diet, her symptoms improved, but they never disappeared completely. Loss of weight continued progressively. The urine was examined regularly three or four times a year, and always showed sugar.

Her general condition remained fairly good, and she was able to carry on an active life until five years previously. At that time, due to a progressive impairment of eyesight, she was placed upon a weighed diabetic diet. The eye condition progressed, necessitating the removal of a cataract from the right eye. The weighed diet was continued with very slight glycosuria, until one month ago, when she fractured a rib. During convalescence she became careless with her diet and glycosuria increased. The symptoms of thirst and frequency returned.

During the past three years there had been dyspnœa on exertion, with moderate palpitation. Within the last six months the above symptoms had been more marked and swelling of the feet had appeared. Lately, a chronic cough with expectoration had been troublesome.

After the cataract operation her vision improved temporarily, but recently the left eye became blind and the vision in the right eye greatly impaired.

Personal History.—Unimportant otherwise.

Family History.—No history of diabetes or glycosuria of any type was known in her family.

Present Condition.—The general appearance was that of a stout elderly female. The skin was warm and wrinkled. There was no cyanosis. The ears and nose were negative. The teeth were false. *Glandular System.*—There was no general glandular enlargement. The thyroid gland was not palpable. *Respiratory System.*—The chest was slightly emphysematous, but symmetrical. Expansion was poor. At both bases posteriorly there were a few moist râles. *Cardiovascular System.*—The pulse was regular, 88 per minute; the tension was increased, and the vessel wall was palpable. The blood-pressure was (systolic) 200, and (diastolic) 50 mm. of Hg. A definite capillary pulse was visible. The heart was moderately enlarged to the left. The sounds were feeble. At the apex a rough systolic murmur replaced the first sound. At the base the aortic second sound was obscured, but no definite diastolic murmur could be heard. *Abdomen.*—The abdominal wall was flaccid, the recti showing marked diastasis, and in the midline there was a ventral hernia. The liver was easily palpable. The other systems showed nothing of importance, except moderate œdema of both legs.

Special Examinations.—The urine was acid, the specific gravity varying from 1014 to 1032; albumen and sugar were present; the microscopical examination showed white cells with hyaline and granular casts. The blood showed a moderate secondary anæmia, and the blood

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Wassermann was negative. The stool was normal. The electrocardiogram showed the findings of definite myocardial change. Renal function studies showed moderate urea and creatinine retention in the blood, with a phthalein excretion of 23 per cent in two hours, and marked inability to concentrate urea (maximum 0.7 per cent after 15 grammes of urea by the mouth).

The special studies upon the urine and blood are shown in Table I.

Based upon the above history and findings, the main clinical diagnoses were:

1. Diabetes mellitus,
2. Chronic nephritis,
3. Chronic myocarditis,
4. Hypertension,
5. Arteriosclerosis,
6. Passive congestion of the lungs, and liver,
7. Umbilical hernia,
8. Cataract (left).

Subsequent Events.—Being discharged from the hospital on May 8, 1924, upon a diet of protein 45 grm., fat 170 grm., and carbohydrate 50 grm., along with fourteen units of insulin before breakfast and supper, she was followed for two months in the out-door department. During that time she remained free from glycosuria.

Two months before the second admission, evidence of marked failure of compensation appeared, confining her to bed. Her appetite failed and she stopped her insulin. She was readmitted on January 27, 1925, with marked failure of compensation. Glycosuria was still present, but to a less degree, without hyperglycæmia (see Table I). After forty days in the hospital she was discharged on March 7, 1925. No carbohydrate restriction in the diet was considered to be necessary. No insulin was indicated. On March 26, 1925, she was readmitted, acutely ill from failure of compensation, dying three hours later.

AUTOPSY FINDINGS

The autopsy (A-79-25) was performed eight hours after death. Exclusive of the organs of special interest, namely the pancreas, the liver, and the kidneys, a heart showing early fatty changes, generalized arterio-sclerosis, and four stones in a dilated gall bladder were found.

The pancreas weighed 75 grm., was soft and flabby, being buried in a large deposit of fat. Sections showed a fairly well preserved parenchyma, a few of the cells forming the acini showing signs of disintegration and atrophy. The islands of Langerhans were numerous, large, and stood out clearly from the parenchyma.

The liver weighed 1,580 grm., had a smooth capsule, and the cut surface appeared as a pale reddish brown of the "nutmeg" type. The substance was firm. Sections showed venous congestion in the region of the central vein, compressing the liver cells, which showed varying stages of atrophy. Throughout there was diffuse fatty infiltration.

The right and left kidneys weighed 160 and 170 grm. respectively. Both were pale, their capsules stripped off with a little difficulty, exposing a finely granular surface. Differentiation between the cortex and medulla was poor, the cut surface having a "boiled" appearance. Sections showed a hyaline degeneration and fusion of the majority of the glomerular tufts. Throughout there was a diffuse increase of fibrous tissue, which replaced many of the convoluted tubules and glomeruli. The epithelium lining the few remaining convoluted tubules was of a low cuboidal type. Scattered throughout the sections, especially in the cortex, were numerous small round cells.

CONSIDERATION OF THE BLOOD SUGAR AND GLYCOSURIA

From Table I it will be seen that upon the first admission in April, 1924, there was marked hyperglycæmia associated with glycosuria. With restriction of the diet glycosuria disappeared on April 10th, when the fasting blood sugar was 0.256 per cent. This indicated a considerably raised glucose threshold in the kidney. Subsequently, during the rest of her hospital stay, there was no glycosuria; a moderate fasting hyperglycæmia, which reacted to insulin, persisted. These findings were typical of diabetes mellitus.

When she was re-admitted in January, 1925, the picture had changed. There was continuous glycosuria of a slight degree, which had little relation to the total glucose yield of the diet. Associated with this there was a normal or a slightly raised fasting blood-sugar. There was a tendency for the blood-sugar to rise after meals, and the increment increase was in pro-

TABLE I.

GLYCOSURIA AND BLOOD SUGAR DATA

Date	Intake		Urine			Blood				Remarks
						Sugar		Urea Nitrogen	Creatinine	
	Protein	"G"*	Glucose		Diacetic Acid	Fasting	Digestion†			
1924	grm.	grm.	per cent	grm.		per cent	per cent	mgms. per 100 cc.		
April 7	58	99	1.6	21.	0	0.370	0.526	40.	2.1	No insulin.
April 10	19	36		0.	0	0.256	0.384	..	...	No insulin.
April 14	20	29		0.	0	0.147	0.136	29.	1.6	No insulin.
April 21	45	34		0.	0	0.135	0.112	23.	2.1	Insulin 4 units.
May 1	45	93		0.	0	0.188	0.125	23.	2.1	Insulin 12 units.
May 5	45	93		0.	0	0.190	0.156	29.	2.2	Insulin 13 units.
May 8	45	93		0.	0	0.198	0.119	...	...	Insulin 14 units.
1925										
January 28	25	59	0.43	2.7	0	0.144	0.113	52	2.1	Insulin 5 units.
January 29	31	66	0.32	3.8	0	0.083	0.051	...	...	Insulin 5 units.
February 2	35	71	0.45	8.5	0	0.093	0.134	...	...	No insulin.
February 9	44	114	0.30	3.3	0	0.123	0.150	...	...	No insulin.
February 12	44	126	0.42	6.0	0	0.120	0.152	...	...	No insulin.
February 16	45	159	0.65	11.0	0	0.134	0.240	...	...	No insulin.
February 23	45	189	0.64	10.8	0	0.178	0.238	...	...	No insulin.
February 27	45	89	0.37	3.0	0	0.134	0.166	...	...	No insulin.
March 2	45	89	0.52	4.1	0	0.153	0.154	...	...	No insulin.
March 5	45	189	0.80	9.4	0	0.170	0.242	...	...	No insulin.

*"G" of diet =C.H.O. + 0.58 P + 0.1 F. (Woodyatt).

†Digestion blood sugar when no insulin was given was taken 1½ hours after the middle of the eating period when insulin was given it was taken 4 hours after the insulin which was given 30 minutes before the meal The units of insulin when given are stated in "Remarks."

TABLE II.

GLUCOSE TIME CURVE*

February 5, 1925.

Time	Volume	Urine Sp. Gr.	Glucose		Blood Sugar
	c.c.		per cent	grm.	per cent
Basal	320	1010	0.3	1.0	0.108
60 min.	Unable to void				0.260
90 min.	...	....	...	...	0.274
120 min.	145	1012	0.5	0.7	0.244
180 min.	Unable to void				0.180
240 min.	185	1007	0.4	0.7	0.150

*50 grams of *glucose* given in 300 c.c. of lemonade at the zero hour. Extra fluid 200 c.c. at 1st, 2nd and 3rd hours.

LAEVULOSE TIME CURVE*

March 3, 1925.

Time	Volume	Urine Sp. Gr.	Glucose		Blood Sugar
	c.c.		per cent	grm.	per cent
Basal	126	1012	0.5	0.6	0.166
30 min.	...	....	...	...	0.218
60 min.	82	1014	0.6	0.5	0.240
120 min.	102	1014	0.7	0.8	0.218
180 min.	78	1012	0.6	0.5	0.198

*50 grams of *laevulose* given in 300 c.c. of lemonade at the zero hour. Extra fluid 200 c.c. at the 1st and 2nd hours.

portion to the carbohydrate content of the meal. Throughout this forty-day period of observation the percentage concentration of sugar in the urine varied from 0.3 to 0.8 per cent, with a twenty-four-hour sugar excretion varying from 2.7 to 11 grm. This occurred with diets varying in their total carbohydrate yield from 59 to 189 grm. No exact determination of the glucose threshold in the kidney was made, but upon two occasions a controlled hour specimen of urine contained 0.3 per cent of sugar when the blood sugar ranged from 0.102 to 0.118 per cent. Thus the threshold was greatly lowered.

Blood Sugar Time Curves.—Two blood-sugar time-curves were done, one after 50 grm. of glucose, and the other after 50 grm. of lævulose (Table II). In both instances there was sugar in the urine with the fasting blood sugar. The higher level of the fasting blood-sugar in the case of the observation on March 3rd is explained by the previous diet. The maximum increment increase of the blood sugar in both curves was reached in 60 minutes; in the case of glucose being 0.166, and in that of lævulose

0.074. The rate of decline of the blood-sugar was similar in both.

DISCUSSION

From the history and chemical findings the data presented a true picture of diabetes mellitus upon the first admission (April, 1924). With the second admission (January, 1925) the findings showed that glycosuria had no relation to the carbohydrate intake within the ranges observed; that the glucose threshold in the kidney had declined from a level of at least 0.256 per cent to at least 0.118 per cent. However, the level of the fasting blood sugar was influenced by the carbohydrate content of the diet, and the blood-sugar showed a marked increment increase after a test dose (50 grm.) of either glucose or lævulose. Further, there was a delayed decline after the maximum peak was reached.

The findings as determined upon the second admission (January, 1925) are not unlike those in a few cases of atypical renal glycosuria that have been followed in this clinic for a ten year period. No dietetic restriction has been observed, perfect health has been maintained, and the blood and urine observations upon repetition have remained unchanged.

SUMMARY

A case is reported which upon the first admission presented the typical findings of diabetes mellitus.

Subsequently renewed observations indicated that a state of atypical renal glycosuria had developed.

The relevant autopsy findings are reported.

ATROPHY OF SUBCUTANEOUS FAT FOLLOWING INSULIN INJECTIONS*

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LOCAL skin lesions at the site of puncture following insulin administration are not uncommon. Frequently, they consist of small areas of tenderness, with or without other evidences of inflammation (redness, etc.). Less often there occur small masses of indurated skin, with or without tenderness, and with or without redness. Slight ecchymoses, due to trauma, are occasionally met with. Actual infection is relatively uncommon. This is remarkable in view of the types of individuals one meets with in a large out-door clinic. The sterile abscesses and superficial necrosis seen in the early days of insulin and due to preservatives are now no longer met with.

These local reactions appear to lead to no general physiological disturbance, except when insulin is injected into the indurated masses. When this is done, the absorption, and therefore the action, of insulin is slow, or it may fail to act completely. This complication is readily overcome by frequently altering the sites of injection.

In addition to the above mentioned lesions, an uncommon reaction is atrophy of the subcutaneous fat. The references to this phase of diabetes are very few. So far as can be ascertained, there is no record of it in Canadian literature, and it is for this reason that this brief report is made.

In this clinic there are now eight patients showing such fat atrophy. The findings in one case are very similar to those reported by Carmichael and Graham of London.[5]

A male, aged 38, with uncomplicated severe diabetes, had been receiving insulin since June of 1924. He required three injections a day. In spite of this he was remarkably free from any local reactions, with the exception of an occasional ecchymosis, until six months ago (October, 1927). At that time he complained of pain over the left shoulder region, accompanied by some weakness of the arm on the same side. The physical examination was negative and it was thought that the symptoms were due either to myositis or were early manifestations of neuritis.

On his return to the clinic one month later, he gave a history of persistent pain and increasing weakness of the same arm. On ex-

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amination, the region about the shoulder joint was normal. In the middle of the arm, on the extensor side, there was a marked depression of the surface, circular in form, and about two inches in diameter. Over this area the skin was comparatively pale and wrinkled. It could be picked up readily and there was obviously little or no underlying subcutaneous fat. With the exception of this area the arm was normal. Since this patient has been receiving insulin he has had many different supplies and has also used different strengths (10, 20 and 40 units per c.c.), because of alterations in dosages required. Needles and syringe have always been kept in 95 per cent ethyl alcohol. A characteristic photograph of this condition may be seen in the lesion nearest the shoulder in Case 1 reported by Barborka.[1] Such marked atrophy of the subcutaneous fat of the thighs as reported by this worker has not been met with.

In three other cases an identical condition was found on the thighs at the sites of puncture, with the exception that there was no pain or weakness of the limbs. In one case there were two depressions on one thigh; in the second, one on each thigh; and in the third there was one on the left thigh. In the last case the area was rather large, about four by six inches. In three other cases the condition was found, as in our first case, over the deltoid region. In the remaining case, it was present on the abdomen over the site of puncture . In none of these was there any pain or muscle weakness. It is interesting here to note that pain and weakness were found in the only patient who followed the practice of injecting the insulin very deeply, some of it probably entering the muscle tissue.

It may here be pointed out that only in two patients were the areas of atrophy of any considerable size. It was only by a careful search for this condition that the remaining cases were found. These areas were such that the underlying muscle could very easily be felt with the palpating index finger. Over these regions there was no wrinkling of the skin, but the absence of subcutaneous fat was obvious. These small pockets of atrophy varied between one-half and one inch in diameter.

Possible causes of the condition were considered and, as others have found, it does not appear to be related to preservatives used in the insulin. This is suggested from the fact that many diabetics have used insulin from the same supply. Nor does it appear to be due to the methods of sterilizing needles and syringe. Of the eight patients in our clinic, who have this condition, five boil the needles and syringe before using them. The remaining three keep their needles and syringe in ethyl alcohol. For sterilizing the sites of puncture, three use iodine and the other five use ethyl alcohol.

Carmichael and Graham suggest that it is due to the insulin itself and attribute it to minute amounts of fat-splitting ferments, since insulin is prepared from the pancreas. If this is the explanation, it is remarkable that more cases are not seen. In order, however, to test this theory, large volumes of insulin were concentrated at low temperature and under reduced pressure. The usual tests for pancreatic lipase (milk-litmus, copper soap, olive-oil-bile, ethyl butyrate) were then applied to the concentrated material. The necessary conditions for the enzyme work (adjustment of reaction, incubation at body temperature, etc.) were adhered to. No lipase could be detected. Unless the concentrating process used tends to destroy lipase it would appear that some other explanation must be sought.

There is nothing remarkable about these patients otherwise, either from the clinical or laboratory aspects. The condition appears to bear no relation to progress.

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Basil M. Tracey reports the case of a girl, aged only sixteen years, who at operation was found to have gall-stones, with gangrene of the head of the pancreas and fat-necrosis in the region of the pancreas and left kidney. There was an early peritonitis. Death occurred in five days subsequent to the operation, the peritonitis becoming purulent. Glycosuria appeared for the first time twenty-four hours after the operation.—*Brit. M. J.*, 1928, i, 346.

XUM

ACUTE INTESTINAL OBSTRUCTION IN INFANTS

BY J. C. S. BATTLEY, M.B.,

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INTESTINAL obstruction in newborn infants and in infancy may result from such a variety of causes that it is probably not so infrequent as one might suppose from a consideration of but a single cause. Two types of obstruction are found: first, that produced by partial or complete occlusion of the lumen of the bowel from pressure without; second, that caused by inherent abnormalities in the bowel. The cases recorded here have prompted a review of these conditions.

Jackson[1] reported the case of a newborn infant who vomited persistently, and who had, as shown by roentgenographic examination, an obstruction about the duodenum. At operation a dense band was found passing from the inferior surface of the right lobe of the liver to the mesocolon, causing a kink and thereby occluding the lumen of the bowel. The band was cut and the patient recovered. Harris[2] had, some years previously, described the same condition in adults, with relief of the symptoms by cutting the constricting bands. He considered these bands to be a persistence of normal embryonic structures. We are familiar with conditions in adults resulting from the presence of peritoneal bands and membranes, such as Lane's band, but those of a similar kind in infants have not been frequently described. The subject of congenital variations in peritoneal relations has been dealt with at length by Harvey and by Bryant. Harvey[3] reported the post mortem examination of 105 infants between birth and two years of age, in whom congenital bands and adhesions were frequently found. He considered these identical with certain adhesions found in adults about the gall-bladder, hepatic flexure, ascending colon (Jackson's membrane), cæcum, appendix, and terminal ileum (Lane's band). He observed that adhesions occurred in nearly 50 per cent of normal abdomens, and brought reasons to show that they were congenital and not of inflammatory origin. Treitz (quoted by Harvey) in 1857, published a study of the retroperitoneal herniæ which now bear his name, and the fossæ and folds involved. Harvey drew attention to the careful work of Toldt in 1879, in which embryos, fœtuses, and children from birth to twenty years of age were studied. Toldt came to the conclusion that the colon and its peritoneal relations showed great variation after birth, and developmental changes occurred for some time during infant life. Bryant[4] stated that, "the frequency of occurrence of adhesions or bands in the fœtuses of both sexes has been greatly underestimated. Of a group of 34 fœtal cases of both sexes only 5.9 per cent were free from demonstrable adhesions or bands." He found that until the age of forty there was no material increase in the frequency of peritoneal bands above the normal found in fœtuses, and that those found with greatest frequency in adults were the ones most frequently present at birth. Niles[5] reported thirty-nine cases of the hepato-duodenal type in adults, in which a review of the histories showed that in almost all instances digestive disturbances had been present in infancy and childhood, some of the nature of cyclic vomiting, acidosis, and "bilious attacks." Neff and Haden[6] found at necropsy two cases of transduodenal bands, which had caused fatal obstruction in children, five years, and twelve months of age. Higgins and Paterson[7] also reported congenital duodenal stenoses due to peritoneal bands.

Structures such as these seem less prone to cause symptoms of obstruction in infancy than in later life. Presumably changes occur in them due to the stress of living, which render them more likely to act in this way in adults. However, the possibility of constricting bands acting as a cause of intestinal obstruction in the newborn and in infancy should be borne in mind.

The mesentery not infrequently takes part in the production of an obstruction, the most common kind being an occlusion of the intestine by the formation of a volvulus. Even if operated upon, these cases are frequently fatal. Reports such as those of Niemeier[8] and of Rowland,[9] in which extensive torsion was present, are illus-

trations. Dott[10] operated upon an eight-day old infant with complete obstruction caused by a 360 degree rotation of the gut, and in whom recovery occurred. Cutler[11] recorded a volvulus in which a mesenteric cyst appeared to be the etiological factor, in a baby three and one-half months of age, but with a fatal outcome after operation. West[12] reported the case of an adult of twenty years, in whom the superior mesenteric vessels had become constricted by the mesentery of a rotated cæcum, forming a band which pressed on the vessels and cut off the blood supply. Lockhart-Mummery and Pennington[13] contributed the report of a young adult in whom a congenital abnormality of the mesentery aided in the production of constipation. An account of a peculiar condition of congenital enclosure of the small intestine in a fibrous membrane, in a fifteen year old child, has been given by Früth.[14] Cutler[15] reported two cases in children, of herniation of the small bowel through a congenital defect in the mesentery, with consequent obstruction. One of the patients, nine years of age, recovered after operation; the other, six years old, died. Treves[16] referred to congenital holes in the mesentery and stated that these might also be of traumatic origin. Spriggs[17] reported a somewhat similar case in which abnormal arrangement of the mesentery played a part. It seems likely that these latter conditions may sometimes be the cause of obstruction in small babies.

Intussusception is the most frequent cause of obstruction in the first year of life, and is sometimes brought about by conditions inherent in the bowel, as a polypus or Meckel's diverticulum. Although uncommon before the third month, it has been found in the first week of life, and Von Reuss[18] stated that it may occur *in utero*. Congenital atresia of the intestine is of very infrequent occurrence, being found about once in 20,000 infants. It may occur at any point of the intestinal canal and in 15 per cent is multiple.[19] The condition is usually fatal in spite of operative procedure, but Sweet and Robertson[20] have reported a case of atresia of the jejunum with recovery. Congenital atresia of the colon has been reviewed by Heckel and Apfelback.[21] A case of congenital narrowing of a part of the terminal ileum with fatal obstruction is recorded by Parmelee and Miller.[22] Greig[23] discussed the condition of congenital microcolon, in which the large bowel, or part of it, is a colon in miniature though anatomically normal. It is functionless, and through it intestinal contents cannot pass. The symptoms are those of obstruction, and the treatment surgical, by early operation and anastomosis of the ileum to the colon beyond the abnormal part. Hawkins[24] discussed the occurrence of idiopathic dilatation of the colon in infants under a year of age. In this disease dilatation of parts of the colon is found which is non-obstructive in causation. The symptoms are vomiting, distension, and constipation, with rapid loss of weight and the appearance of malnutrition. The operative procedure is an anastomosis of the ileum with the iliac colon. He reported a case in a three weeks old baby who died after operation. Diaphragmatic hernia is another possible cause of intestinal obstruction in infants,[25, 26] though the symptoms are usually of a respiratory nature. A tendency for congenital abnormalities of the gastro-intestinal tract to recur in the same family has been noted. The cases here reported are examples of this. Greig[23] mentioned two instances of recorded cases in which successive children were born with atresia ani, and the following child with congenital microcolon, and Walker[27] observed three successive children with atresia of the rectum.

REPORT OF CASES

CASE 1

J. W. L. was a full-term male infant; delivery was normal, and his parentage healthy. He was breast-fed, with supplemental feeding, and gained slowly during the first two weeks of life. He then began to vomit in a projectile manner after feedings, and weight was rapidly lost. The temperature was normal. Peristaltic waves were seen passing over the epigastrium, and the stools became of the starvation type. A diagnosis of hypertrophic pyloric stenosis was considered, but a roentgenographic study of the gastro-intestinal tract showed no obstruction at the pylorus, but a definite blockage about four inches below this point. Later, this was relieved and the barium passed on apparently freely. Intraperitoneal saline injections were given to lessen dehydration. After more or less continual vomiting for a week, the food was retained better, and finally only a slight degree of regurgitation remained. At this time he came under the writer's observation. Examination showed an extremely under-nourished baby, weighing 5 pounds and 7 ounces. The subcutaneous tissue was greatly reduced in amount, the skin inelastic, and the eyes and fontanelles were sunken. The lungs, heart and abdominal organs were apparently normal and no abdominal tumour was felt. He was ravenously hungry, and after feeding, waves of gastric peristalsis were seen but were not consideded abnormal. No vomiting occurred and the temperature was normal. He was given a high caloric feeding at three-hour intervals. On the day following admission, the food was well taken with no vomiting or regurgitation; the stools were frequent and rather loose. On the second day the baby lost

weight, became considerably dehydrated and was given intraperitoneal saline and a blood transfusion. Shortly after this the abdomen became markedly distended, vomiting started and he rapidly sank and died within 24 hours.

Necropsy.—The peritoneum was everywhere slightly reddened and the peritoneal cavity contained 100 c.c. of slightly bloody fluid. The small intestine was inflated and the colon collapsed. The base of the mesentery appeared to be narrower than normal. The duodeno-jejunal fossa was dilated and contained a loop of jejunum. The bowel in this situation was held in an abnormal position by a short œdematous band that pressed against the jejunum, causing a narrowing of its lumen. The narrow base of the mesentery was twisted round its own axis for 180 degrees, causing a complete obstruction of the small intestine. There was no evidence of pyloric stenosis. The duodenum was dilated and its mucosa hyperæmic and covered with thick mucus. The part of the bowel lying in the duodeno-jejunal recess was collapsed, empty and pale. Beyond this point inflation was again present. The mesentery was swollen and infiltrated with blood, and the lymph nodes were in a like condition.

Although it appeared that the volvulus was the immediate cause of death, the reason for the obstruction noted during the roentgenographic study was clearly shown by the presence of a retroperitoneal hernia, or a hernia of Treitz, the bowel being held in the abnormal position by a peritoneal band.

CASE 2

M. L. was a sister of the patient in Case 1, born eighteen months later. She weighed six pounds five ounces, and was under continual observation in a hospital from the time of birth. The patient vomited on the day following birth, and after some of the feedings on the second day. On the third day vomiting became very forceful and subcutaneous fluid was given. On the fourth day a roentgenographic study was made. The stomach appeared to be normal but emptied only slightly in one hour. In two hours some of the barium was in the duodenum, but none had gone farther. There appeared to be some dilatation of the intestine. Succeeding hourly examinations, up to five hours, showed the same condition, very little barium having passed beyond the first part of the duodenum. On the following day the findings were much the same, though more barium had passed the point of obstruction.

Operation was performed under local anæsthesia. On opening the abdomen the small intestine was seen, bluish in colour, and containing little gas. The transverse colon was considerably distended. As the operation proceeded it was observed that the mesentery with its vessels was tightly drawn across the duodenum, causing an obstruction. The small intestine was lifted, and a half turn found to be present was released, greatly relieving the pressure on the duodenum. A blood transfusion was given. The patient made satisfactory progress and two weeks later was discharged, weighing six pounds fourteen ounces, in good condition, and with complete retention of food.

Ten days later she was re-admitted, as the parents noticed she had started to vomit, and had been warned to bring her back immediately should this occur. The temperature was normal, but rose to 103° on the next day. Vomiting of nearly all of the feedings took place. A roentgenographic examination showed that only a small amount of barium had left the stomach in one hour. Five hours later the same condition persisted. It seemed clear that an obstruction was present near the stomach and a laparotomy was decided upon. On opening the abdomen distended bowel was immediately forced through the incision. Some free fluid was present in the abdominal cavity. Loops of bowel, bound together by dense adhesions, and a generally reddened appearance of the peritoneum, were evidence of peritonitis. The stomach and pylorus were normal. There was a volvulus of the small intestine which, however, was considerably confused by the many adhesions. About two or three feet from the ileo-cæcal junction there was a definite point of collapse, above which was distended bowel. The bands were released but the collapsed bowel did not readily fill. The obstruction seemed explained more on the basis of constriction by adhesions than by the volvulus. On account of the condition of the patient, it was felt necessary to close the abdomen without making as extensive an examination as was desired. The baby died shortly after. A necropsy was not obtained.

At the first operation a volvulus which was successfully relieved was found to be the cause of the obstruction. Had it not been for the subsequent peritonitis, a permanent recovery might have been made.

COMMENT

When one considers the many possible causes of intestinal obstruction in infants, an accurate diagnosis would in most cases appear impossible. Indeed it would seem to be unnecessary as long as an obstruction in itself is recognized, for valuable time may be lost in attempting to fit the signs and symptoms into a given syndrome. The important point is the early recognition of the presence of a block and operation before the child gets into a dangerous nutritional state. Delay in small infants is fatal. Dehydration may occur so rapidly that, to borrow a chemical term, the reaction may soon become irreversible. When unusual vomiting occurs in an infant, steps should at once be taken to keep up the body fluids, and to give, if necessary, parenteral saline or glucose, or a blood transfusion. The use of sodium chloride solution, interstitially or intra-venously, in cases of upper intestinal tract obstruction, would seem especially indicated, according to the work of Haden and Orr.[28, 29] They have shown that the fundamental change in such obstruction is a fall in the chloride content of the blood. Roentgenographic examination of the gastro-intestinal tract with small barium meals and barium enemas may be of inestimable help. This important aid to diagnosis has not been afforded the consideration it deserves in gastro-intestinal conditions in babies. The high mortality is discouraging, but cases in which recovery has occurred give hope for the future. Writing on congenital intestinal occlusion, Spriggs said, "The writer considers that as soon as the diagnosis is made, laparotomy should be performed, firstly, because the condition cannot be diagnosed with absolute certainty from others occurring at or soon after birth, such as volvulus, intussuscep-

tion, internal strangulation, etc., which may be remedied; and, secondly, because he believes that in the future some of these cases will be saved."

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ON THE MODERN METHOD OF PRESCRIBING

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IN a recent inquiry into the extent of the use of proprietary and patent medicines in prescriptions written in Canada, Burbidge[1] shows that on an average 24 per cent of the medicines prescribed belong to these classes. They vary from relatively good preparations of certain official drugs to the most flagrant forms of quack mixtures.

The reasons alleged for this extensive use of non-official drugs and preparations are numerous. Amongst them may be mentioned the advertising activity of the manufacturers, coupled with a certain attitude on the part of some medical men, who prefer to avoid the task of writing prescriptions. Before passing from this subject, I should like to say that one cannot consider it creditable that so many of the useless or superfluous drugs now sold directly to the public come on the market by way of the medical profession. In this connection, the history of a certain substance that purported to be an active principle of garlic is most instructive. This body was first advertised strictly to the medical profession, and was recommended for many things, but especially tuberculosis. In a very short time, more than ten thousand medical men were prescribing it. On analysis, however, the report showed it to be rather impure tap-water with a smell. One has often wondered what the patients of these ten thousand odd doctors thought when this analysis appeared in the public press, especially as the preparation was sold at a high price.

A further reason for this practice is no doubt that some mixtures are more elegant than those the doctor is able to prescribe, or, possibly, the pharmacist, compound. Some of the effervescing aperients are actually cheaper than if purchased in a purely ethical way. A very few may be really better than the official compounds. Is this because the manufacturers possess, as they ever strive to impress, certain wonderful trade secrets? The history of a substance recently introduced for the treatment of sleeping sickness should, I think, convince anyone that it is practically impossible to keep such a secret, if it is worth finding out. No, the chief reason would appear to be that the average medical

man does not take sufficient interest in his official standards, largely prefering to leave them in the hands of the few who will shoulder the burden.

Many other factors exist, bearing on this matter, which would take too much space to discuss here. One, however, which I am convinced is of great importance, is the unnecessarily complicated and cumbersome method of prescribing.

Like everything else in medicine, prescribing is changing. Only two hundred years ago a prescription was itself a precious thing, having intrinsic virtues of its own, and was drawn up with the care of a legal document. To-day, the prescription is merely an order for some drug or combination of drugs to be given to someone, and often appears to be less carefully written than a dog-license. In spite of this, the now sadly tattered and terribly worn, but still quite recognizable, form of the prescription is still in use, complete, with the invocation to Osiris, and written in the degenerated remains of what was once supposed to be Latin.

So difficult are the calculations involved that special courses are in vogue in pharmacy schools, and kindly manufacturers present little tables of calculations to young graduates. After certain years of practice, the more clever medical men can use this system fairly freely, but their weaker brethren rely on memory prescriptions, unless they jump the side-rails of ethics completely and use ready-made prescriptions, such as, "elix. pepsin co." Of course, any individual in the medical profession may find such a proceeding advisable, but, for teaching purposes, the use of such prescriptions in the wards, thus stamping them as standard practice, is disastrous. Not only do the students fail to learn to prescribe intelligently in our large hospitals, but actually learn to use preparations of whose composition they are ignorant, or at the best very hazy.

About 1858, when the first British Pharmacopœia was written, this question of weights and measures was most earnestly debated by the leading pharmacists, who readily appreciated the difficulties of the old empirical system, then and still in vogue. At least three metric systems were proposed, but without success. In 1914, fifty-four years later, the metric system was made official along with the older one, but unfortunately, in such a form as to cripple its chances of adoption. Able mathematicians carefully translated the exact equivalents into four decimal places, and new and entirely unnecessary units were introduced. The practical result was that very few physicians used the new system. The older men found it too much trouble to change, and the younger men were influenced by the older ones. Furthermore, the mere introduction of a new system of measurement, however good, does not in itself greatly facilitate prescription writing. To-day, how- a new factor appears. We have now a number of very important substances, of which the dose is known to the profession in the metric system. Moreover, practically no work of any importance is now being carried out, either in laboratory or clinic, which does not make use of this system, so that frequently we have appearing on the same patient's chart, grains, grammes, cubic centimetres and ounces. We are thus clearly ripe for a change to a more orderly method.

In the earlier undergraduate years the scientific teaching staffs emphasize the metric system; unfortunately their clinical colleagues, in the later years, reverse this teaching, and as they have the final say with the students, their method usually dominates. As soon as the clinical teachers make use of the new system, the old will rapidly disappear, but not till then. Is this change possible? The actual change itself offers but little difficulty. It is very easy, and anyone could after a few days become accustomed to writing in the new system. The real difficulty lies in overcoming that inertia to attempt anything new, which caused Osler to utter his famous remark of: "Too old at forty." What does the conversion from one to the other mean? Simply:—

1 grain is the equivalent of 60 milligrammes (64 exactly).
15 grains is the equivalent of about 1 gramme.
15 minims is the equivalent of about 1 cubic centimetre.
1 drachm is the equivalent of about 4 cubic centimetre.
1 pint is the equivalent of about 500 cubic centimetres.

Vice versa, 1/64 grain may be called 1 milligram for the difference between 1/60 and 1/64 is entirely negligible, and it is well within an allowable error.

One teaspoonful may be called the equivalent of 5 c.c.

One dessertspoonful may be called the equivalent of 10 c.c.

One tablespoonful may be called the equivalent of 20 c.c.

These figures are not true equivalents. There is no need for them to be so, since the old system is far from exact, and the doses therein are merely a matter of convenience. In this connection one might point out, with all due respect to the pharmacopœal doses, that they are at the best only indicative, and in certain patients may be, and often are, quite inadequate. Thus the pedantic might say that a teaspoonful is nearer 4 than 5 c.c. What of it? If one teaspoonful of tincture of rhubarb fails to work you tell the patient to take two. Certainly, if one fails, two will not do harm. Furthermore, the average teaspoon will deliver anything from 3 to 6 c.c. according to the person who is using it. Thus, the dose falls within the experimental error in any case. There is no doubt whatever that with active substances, like digitalis, where it is required that the dose shall be reasonably constant, the teaspoon is not sufficiently accurate under any system. An equivalent for the ounce is more difficult to arrange. Actually it is about 30 c.c., but for convenience it may be regarded as 25 c.c. (or gramme), since 100 c.c. then conveniently goes into the four ounce, and 200 c.c. into the eight ounce bottle. In writing, however, a modern single dose prescription, these difficulties do not arise.

What is the attitude of the doctor in writing a prescription? Should it be—Ah! I have a case of pneumonia here, shall I give Dr. X's or Dr. Y's prescription? To that procedure I have no hesitation whatever in offering condemnation for the reason that such a course leads, and has led, to substituting for Dr. X's or Dr. Y's prescriptions those of Messrs. Torroid, or Dark and Belcombe. Furthermore, every leading authority insists that medicine is an art, that no two cases are alike. The same mixture and the same dose should not be given to all cases impartially. The modern prescription should be written entirely from the standpoint of what may be the best for the patient, after careful examination, and offers no great difficulty.

The following is a prescription taken from the books of a local druggist.

℞

Sodii brom.	xl gr.
Magnes. carb.	℥ i
Creasoti	x drops
Bismuth subcarb.	℥ iij
Sp. chloroformi.	℥ iiss
Glycerini.	℥ i
Aquam ad.	℥ iv

Sig, ...
℥ j ex ℥ aq. p.c.

What is the individual dose of any one of the components? The same prescription written as a single dose using the metric system would be as follows:

Sodii brom.	1
Magnes carb.	2
Creasoti	05
Bism. subcarb.	5
Sp. chloroformi.	2
Glycerini	2
Aquam to	5

Send 100 c.c.

Mark: one teaspoonful in a tablespoonful of water after meals.

From this prescription it will be seen at once that the doses of sodium bromide, glycerine, magnesium carbonate, and spirits of chloroform, are below the minimum pharmacopœal dose. As the bromide action is apparently desired, this will be of some moment.

Two great advantages stand out with the new system. Firstly, the absence of practically any calculations, thus greatly assisting the beginner who has not formed his conditioned reflexes; and secondly, and this is really fundamental, that the whole attention can be focussed on the patient.

Of course the single dose prescription is not new, but amongst many people there is a queer prejudice against its use, the reason for which is very obscure, since it is unquestionably simpler, and thus less liable to lead to error in dosage. It is often stated that a prescription is easier to construct in Latin than in English. This is open to question. After all, what great difference is there? In any case pharmacy tainted with imperfect Latin is disappearing, apart from the names of the drugs, which, owing to the position of the law of standards, must at present stand. In this connection it is hoped that this will soon be altered, so that any substance under any name must be of a certain purity if used in a medical prescription.

A further criticism is frequently offered,

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that one cannot think in three places of decimals. This is true, yet it is not in the least necessary. Actually, all small doses become milligrams, easily translated from grains to milligrams by dividing the fraction into 60 or 64. Thus, 1/8 grain is 8 mg.; 1/12, 5 mg.; 1/32, 2 mg.; and so on. They are written in the prescription, using the decimal line as for the other units, but followed by the letters mg. Thus:—

Morphin. hydrochlor.	10	mg.
Hyoscin, hydrobrom.	5	mg.
Aq. steril. to	1 | 0	c.c.

Or, if it is earnestly desired to keep the amounts in grammes or their equivalent (cubic centimetres), the prescription would appear thus:—

* Morphin. hydrochlor.	0 | 010	
Hyocin, hydrobrom.	0 | 0005	
Aq. steril. to	1	c.c.

Some might take exception to the above method, on the ground that the multiplication must be made by the druggist and that mistakes may occur.

Finally, an objection may be raised that the patients cannot understand, and are more impressed by, the old prescriptions. This is rather a dubious point to take up, since any patient who is sufficiently interested can always find out, and does so. If it is really necessary to preclude the patient from discovering his drug-treatment, the only safe way is to have his medicine made up for him, and not give the prescription at all.

It is sincerely hoped, therefore, that these main facts that have been brought forward will add their stimulus to the many others in favour of the adoption of the modern method of prescribing, which, one is quite confident, will help not only to simplify drug-therapy, but will, by focussing more attention on the patient, and less on the form of his prescription, help to correlate more closely pharmacological knowledge with therapeutic practice.

* The Editor desires to state his opinion that the second formula is less liable to lead to error.

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BACTERIOLOGICAL STUDIES IN CHRONIC ULCERATIVE COLITIS*

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THERE have been several cases in the wards of this hospital which I think will be of interest from the bacteriological standpoint. They were cases of chronic ulcerative colitis, five of which were diagnosed clinically and one at autopsy. Since that time one of the first five has died, but no autopsy was obtained, though a surgical specimen was obtained at operation.

The first case which came under notice was one of extensive ulcerative colitis, from the stools of which cultures were made several times. No organisms like those of dysentery were found, but a striking thing was the great preponderance of Gram-positive diplococci in the cultures. In this case an ileostomy was done, and the appendix was removed. In the appendix no ulceration was found, but a fairly extensive abscess in the submucosa, which had not ruptured, and from which cultures were taken (Fig. 1). These gave pure growths of Gram-positive diplococci.

Since that time we have isolated a similar organism from five other cases: in three cases from the stools; in two from ulcers in the colon, at autopsy; and in one case, on two different occasions, from the mucosa of the bowel by the proctoscopic method. In this last instance an autogenous vaccine-filtrate was prepared, by the method described by Bargen, and it is being used in the treatment of the case.

Chronic idiopathic colitis is to be differentiated from the dysenteries of specific types, such as those caused by *Entamœba histolytica*, *B. dysenteriæ*, *B. tuberculosis*, and those due to poisons, as in the toxæmia of nephritis, arsenic, mercurochrome, etc. It is characterized by an intractable bloody diarrhœa, and sometimes abdominal pain; later on by anæmia, fever and

* Read before the Staff Clinico-Pathological Conference, Montreal General Hospital, March 8, 1928.

general debility. Frequently, also, there are remissions and relapses. Locally, the mucous membrane of the colon is hyperæmic and œdematous, and bleeds easily; in some cases there may be a profuse exudate covering the surface

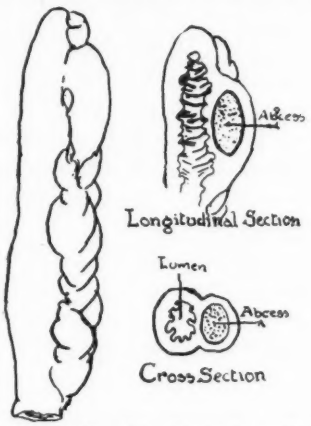

Fig. 1.—Appendix with abscess in wall from which organisms were isolated.

with, later, superficial and deep ulceration. The inflammatory process begins in the submucosa as an abscess formation breaking through the mucosa, and, eventually, forming ulcers with shaggy undermined edges.

The condition has been known for some time. It was mentioned by Wilks and Moxon[16] in 1875 and described more fully by White[14] in 1888. In a summary by Hawkins[5] it was pointed out that the "bloody flux" of Sydenham, in 1669, was probably of the same nature. The causative organism in the disease has commanded much attention. Bassler[3] gave *B. coli* a significant place in its causation. Jex-Blake[8] recovered *B. coli, B. proteus, B. pyocyaneus* and *streptococci.* White[15] believed the causation to be *B. coli* and *Diplococcus pneumoniæ.* Stone[12] and Yeomans[17] found the usual intestinal inhabitants. Wallis[13] recovered *streptococci,* and stressed the importance of infection probably coming from the mouth. Hewes[6] reported cases which were a sequel of pneumonia, influenza, measles and diphtheria. Mummery[10] isolated *streptococci* and *B. coli,* and stated that in the spongy, hæmorrhagic form, with a granular easily bleeding mucosa, the *diplococcus of pneumonia* was the causative factor. Others believed that *B. dysenteriæ* was the primary infection, with secondary invaders coming later. Among these are Einhorn,[4] Hurst[7] and Leusden.[9] Hurst reported good results with polyvalent antidysenteric sera, and Leusden advocated the use of autogenous vaccines.

Bargen, of Rochester, working with Logan,[2] began by trying to find dysentery-like organisms, but was impressed by the presence of many Gram-positive diplococci in smears made from the lesions. In the Mayo Clinic during two years, he isolated a Gram-positive diplococcus in 90 per cent of the cases of ulcerative colitis.

The procedure of obtaining the cultures is as follows: the bowel is repeatedly cleansed with warm-water enemata. Then through the proctoscope or sigmoidoscope the bowel is cleansed with sterile swabs, and the culture taken by scooping into the base of the ulcers, or by scraping the ulcerating mucosa.

The organism is lancet-shaped, resembling morphologically the pneumococcus, but slightly larger. In disease states it is always a diplococcus, but later grows in chains so that it is probably a streptococcus. It does not agglutinate with the pneumococcic sera and its cultural characteristics are different.

Rabbits, injected intravenously with freshly isolated cultures from the ulcers, die in from five to seven days with marked diarrhœa, and with the typical ulcerations in the colon, without lesions elsewhere. Some dogs used in the same way developed the colonic ulcerative lesions and also cholecystitis. From these experimentally produced lesions the organism is easily recovered and has increased virulence.

It appears that the disease is infectious and that it occurs from successive showers of organisms being thrown into the colon, probably from the blood stream.

The association with upper respiratory infections, infected teeth, chronic tonsillitis, or even gall-bladder disease is interesting. Bargen reported several cases in which the same organism had been recovered from such foci, and where the irritation of such a focus, as by the removal of a devitalized tooth, produced a very severe temporary exacerbation of the condition.

Vaccine therapy has been found of great value in the treatment of this disease. Vaccines or vaccine filtrates are used, and both give good results. In the Mayo Clinic they are used successfully when associated with the removal of distant foci of infection, local measures, and some empirical treatment, such

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as iodine by mouth, etc. Ileostomy is performed but seldom, and only as a life-saving measure.

The value of this vaccine treatment is illustrated in the following report of one of Bargen's[2] cases.

A woman, aged 31, came to the clinic May 19, 1924, with a history of having had bloody diarrhœa with mucus and pus during the last year. She had had from fifteen to forty stools in twenty-four hours, with severe abdominal cramps and rectal tenesmus. Except for two weeks of freedom, two months before coming to the clinic, her trouble had steadily progressed, with a loss of twenty-eight pounds in weight.

A very diffuse, active, ulcerative procto-sigmoiditis was found on protoscopic examination. A skiagram showed that the disease included the transverse colon. Repeated examinations of the stools failed to reveal protozoan parasites or the bacillus tuberculosis, but Gram-positive diplococci were isolated by culture from the ulcerated regions. Because of the patient's acute condition she was admitted to the hospital, and given daily hot-water irrigations at a (temperature of 120° F.), argyrol instillations, kaolin and tincture of iodine by mouth, and an autogenous vaccine. The vaccine treatment was continued for four months, (until September, 1924). Four months later (January 7, 1925) she reported for re-examination. By proctoscopic examination the bowel was found to be entirely healed. The roentgenogram of the colon was negative. She had one well-formed stool daily, and was clinically well. Other similar cases are given.

The bacterial etiology is still causing considerable controversy. Thos. R. Brown[19] has been able to isolate Bargen's diplococcus in only a small proportion of his cases and he believes that the disease is more probably due to the absence of something in the bacterial intestinal flora than to the presence of a definite organism. This deficiency theory is of interest here in that Bargen has been more successful in reproducing the disease in rabbits debilitated through the feeding of a vitamine-free diet for ten days; probably debilitation in one form or another is a predisposing factor.

Moses Paulson,[21] of Baltimore has been able to reproduce the disease with various strains of streptococci which originally appeared as diplococci in their freshly-isolated state. He differentiates different strains of these streptococci by their hæmolyzing zones on blood agar, and concludes that the organism described by Bargen is not a distinct entity and, therefore, that his diplococcus is not specific. But, though interesting, his findings do not detract from the work of Bargen, whose treatment by the aid of autogenous vaccines in the Mayo Clinic is very encouraging.

SUMMARY

Six cases of chronic ulcerative colitis are described.

From each of these pure cultures of Gram-positive diplococci were obtained, which corresponded with the type of diplococcus described by Bargen.

There is still doubt as to whether this organism is the cause of chronic ulcerative colitis, but the results obtained by the use of vaccines prepared from cultures of it are encouraging.

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At a meeting of the Section on Children's Diseases of the Royal Society of Medicine, held on March 23, Dr. Donald Paterson showed a case of "Pink Disease," four and a half years after recovery. The patient was an infant, aged one year, who was in hospital for four months, suffering severely from recurrent attacks of diarrhœa. The knee-jerks were absent for some time, and there were patches of analgæsia. The cerebrospinal fluid was normal. The Von Pirquet test was negative. When three and a half years old the child was readmitted to hospital with acute cerebellar ataxia, from which she recovered completely. The reflexes were now normal, and there were no permanent changes in the skin.

Case Reports

A CASE OF ULCERATIVE COLITIS, IN A CHILD, ASSOCIATED WITH A BULLOUS SKIN ERUPTION

BY W. P. WARNER, M.B.

Welland

The following case is of interest because it shows the course of a colitis, lasting four years, and associated with a bullous skin eruption, in a child seven years old. This is one of the youngest cases of ulcerative colitis reported, Helmholtz reporting one at eight years of age. The patient had recurring crops of blebs over the body and in the mouth and nose, which were associated with elevation in temperature, malaise and an aggravation of the colitis. The skin condition resembled what is described as benign pemphigus.

Margaret W.—Born in Welland, 1916. Had never left Ontario. She died in 1927 at the age of 11 years.

Present Illness.—In August, 1923, (age 7) she began to have diarrhœa, with two or three bowel movements a day, with diffuse abdominal pain and tenderness; blood, mucus and pus were found in the fæces; loss of weight was noticed. This continued until December, 1923, when the diarrhœa ceased and she gained weight until May, 1924. The mother is unable to remember if blebs appeared on the skin during this illness. In May, 1924, blebs ranging in size from a five to a twenty-five cent piece appeared on her back, abdomen and chest; the temperature rose to 101 degrees each afternoon; five or six fluid movements occurred each day containing blood, pus and mucus, but at this time there was no abdominal pain. The recurring crops of blebs, elevated temperature and diarrhœa persisted until December, 1924, then disappeared with the exception of loose bowel movements, containing no blood or mucus.

In March, 1925, she had a sharp elevation in temperature, reaching 102 degrees in the afternoon, associated with crops of blebs on body and limbs, anorexia, loss of weight, increase in diarrhœa, with eight or ten movements a day containing blood and mucus.

In July, 1925, another sudden elevation in temperature, with crops of blebs over entire body, as well as in the nose and throat, making the typical crusted appearance of pemphigus. Some of these blebs on the body, as large as hens' eggs, became infected, others ruptured and disappeared without becoming filled with pus. The diarrhœa continued from March, 1925, with about the same number of movements, ten or twelve a day, containing blood, pus and mucus. At this date, patient had a slight cough with sputum, which was present for several months. There was marked emaciation and weakness.

From November, 1925, until July, 1926, patient improved, regained weight, and her temperature became normal, only becoming elevated when she had a crop of blebs on her skin and occasionally small ones in her mouth. The blebs were not so numerous nor so large, and were not accompanied by so much systemic reaction as previously. The diarrhœa continued, with mucus, blood and pus, but gradually lessened until she had only three or four movements a day; at this time the blood and pus disappeared for several weeks at a time. She had no formed stools from 1924 until her death, in 1927.

Recovery was so marked that in the fall of 1926 she started to go to school for the first time. Small crops of blebs continued during the fall of 1926 and spring of 1927; these were accompanied by small systemic reactions. The bowels moved three or four times a day, always fluid and very occasionally showing blood and pus. Her weight increased with her strength. In March, 1927, she began to lose weight and became fatigued more easily; the blebs on her skin came in larger crops and at shorter intervals; her diarrhœa increased, and blood, pus and mucus appeared constantly in her fluid bowel movements. In June, 1927, she contracted a severe type of scarlet fever, and developed what was thought to be bronchopneumonia on her right side, and died.

XUM

Family History.—Negative for tuberculosis. No family history of diseases with continued diarrhœa or with skin eruptions.

Past History.—No childhood diseases. Influenza and bronchitis in 1919. Rapid recovery after two weeks. Pyelitis in February, 1923. Good recovery.

Physical Examination.—The patient, at eleven years of age, looked like a little old woman, with a slight kyphosis, and with flaring lower ribs. She was pale and poorly nourished. From time to time, coarse râles and rhonchi could be heard over her chest; but no area of consolidation. Repeated sputum examinations were negative for tubercle bacilli. Intracutaneous, and later, subcutaneous, tuberculin tests were negative.

Other than in 1924, no abdominal pain or tenderness was noted, but the patient was singularly insensitive to all painful stimuli. The lower edge of the liver was not to be felt: the spleen appeared to come to the costal margin. She had a high diaphragm and was quite thick in the antero-posterior diameter at the lower costal margin.

The crop of blebs that appeared on the skin were superficial, clear, and ranging in size from a five cent piece to a hen's egg. The blebs appearing in the mouth and nose were typical and became crusted. When a crop appeared, they appeared over the whole body, but were more numerous around the buttocks and perineal region.

X-ray Examination.—Stereoscopic plates of chest revealed diffuse thickening of the bronchial tree. No evidence of tuberculosis. Barium enemas given between November, 1925, and June, 1927, showed typical colitis, affecting the entire large bowel. Between November, 1925, and January, 1927 slight improvement took place in the x-ray appearance of the colitis.

Bacteriological Examination.—Fæces: repeated attempts to find tubercle bacilli were unrewarded; as also were attempts to find entamœba histolytica. The fæces were cultured for *B. dysenteriæ* with negative results. These results were checked over through the kindness of Dr. Gordon Cameron, Toronto General Hospital. As no proctoscopic examination was done, cultures were not made for the diplococcus of Bargen. The blood culture was negative. The sputum was negative for tubercle bacilli. Fresh blebs gave a negative culture. Those that later became infected showed *S. albus.*

Examination of the Blood.—Wassermann negative. White blood cells, 7,600. Red blood cells 4,000,000. Hæmoglobin 60 per cent.

Differential count showed a secondary anæmia: polymorphonuclears 43, lymphocytes 40, endothelial 16, Eosinophiles 1.

Treatment.—The improvement in the patient's general condition, commencing in May, 1925, followed a period of about nine months' rest in bed, with every attention paid to building up her strength. Bowel irrigations of saline and tannic acid were given; arsenic was administered by mouth. Actinic ray was given. Repeated courses of emetine failed to influence the course of the disease.

Pathological Report.—The report on the liver, spleen, lung and large bowel, was made by Dr. W. L. Robinson, Toronto General Hospital, and was as follows:

The piece of large bowel measured 22 cm. in length; it was somewhat contracted. On opening, the mucosa was found to be moderately injected and covered with a thin coating of mucus. No areas of ulceration could be detected. Sections taken from the large bowel showed very marked infiltration of the mucosa with lymphocytes, plasma cells, and a few eosinophiles. The crypts were filled with polymorphs. There was no evidence of ulceration. The submucous tissues showed considerable increase in fibrous tissue. *Diagnosis.*—Subacute and chronic colitis.

The liver measured 20 by 15 by 3.5 cm. It was quite firm in consistence. The surface was somewhat nodular. There were bluish red areas of depression scattered throughout the whole section of liver. Microscopic section showed a fibrosis, confined to the portal areas, apparently unilobular in type and showing a very marked inflammatory reaction, characterized by a lymphocytic infiltration of the bile ducts. *Diagnosis.*—Infective sclerosis of the liver.

The spleen measured 17 by 7 by 5 cm. It was moderately firm in consistence and cut with some resistance. The microscopic section showed a rather diffuse fibrosis with focal collections of endothelial cells, plasma cells and eosinophiles. *Diagnosis.*—Subacute and chronic splenitis.

The lung contained multiple abscesses.

COMMENT

The colitis was of the severe type with marked emaciation and profound systemic reactions. Accompanying and generally preceding by a few days the onset of an exacerbation

of the colitis, there appeared on the skin and on the mucous membrane of the nose and pharynx, pemphigus-like blebs. The condition improved with bed rest, colonic irrigations, diet high in vitamines and actinic ray. Bargen's vaccine filtrate was not used as the organism was not isolated.

X-ray examination of the colon by barium enema gave the characteristic appearance of an ulcerative or suppurative colitis, with complete loss of haustrations, and by repeated examinations over varying intervals, slight improvement could be demonstrated.

The presence of the *B. tuberculosis, amœba histolytica* and *B. dysenteriæ* were excluded as etiological factors. Unfortunately Bargen's diplococcus was not looked for. Bacteriological examination of the skin gave no clue as to etiology.

The termination of the disease was rapid as is generally the case (Soper). In this patient it was hastened by the attack of scarlet fever. The immediate cause of death was the lung abscesses, which were probably embolic from the colon.

The post mortem examination showed the colon to be contracted, with greatly thickened walls; marked infiltration of the mucosa with lymphocytes, plasma cells and a few eosinophiles; the submucous coat was considerably thickened with fibrous tissue. The section of the colon probably showed the end stage when all ulceration had disappeared. The sclerosis of the liver and subacute splenitis were quite marked.

The protracted course of the idiopathic ulcerative colitis in a patient, 7 years old, with the definite association of a pemphigus-like skin eruption, are the points of interest in this case.

Conclusion.—This case shows an ulcerative colitis commencing in a child, 7 years old, with profound constitutional symptoms, lasting four years, with fatal termination. The recurring crops of blebs, on the skin and the mucous membrane of the nose, throat and mouth, were accompanied by an aggravation of the existing diarrhœa, a sharp rise in temperature and an increase in the general constitutional symptoms. The etiological factor was not found.

TWO CASES SHOWING UNUSUAL SURGICAL AFFECTIONS OF THE MESENTERY

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Chylous Cyst of the Mesentery

A review of the anatomy shows that the lymphatics of the jejuno-ileum originate in the mucous membrane in the central lacteals of the villi and are directed to a rich plexus in the submucous coat. This also receives vessels which proceed from plexuses in the subserous layer and from between the muscular coats. The lymphatic vessels leave the intestine at its hilum and enter the mesentery where they are connected with the mesenteric glands. These vary in number but on an average they probably amount to two hundred and lie for the most part in close relation to the arterial arches. The deepest and at the same time the largest glands lie at the upper part of the root of the mesentery and are closely grouped together. The vessels which leave these glands converge to a common trunk, emptying its contents into the receptaculum chyli which lies upon the right side of the body of the second lumbar vertebra.

Taylor[1] in his *Applied Anatomy* states that "Cystic tumours of the mesentery are usually of lymphatic origin (serous and chylous) and their contents may be clear and watery or of a milky appearance and consistency. The size of these cysts varies; they have been met with as large as a child's head. In some cases they are probably congenital in origin (cystic lymphangiomata) and apparently communicate with the surrounding lymphatic vessels in the mesentery."

Osler[2] in speaking of cysts of the mesentery says, "They may be either dermoid, hydatid, serous, sanguineous or chylous; they occur at any portion of the mesentery and range from a few inches in diameter to large masses occupying the entire abdomen. The symptoms usually are those of a progressively enlarging tumour in the abdomen. The general health as a rule is well maintained in spite of the progressive enlargement of the abdomen, which is most prominent in the umbilical region. They may persist for many years. The diagnosis is extremely uncertain and no single feature is in any way dis-

tinctive. The important signs are: the great mobility, the situation in the middle line, and the zone of tympany in front of the tumour; of these the second is the only one which is constant. It is most frequently mistaken for ovarian tumour. In certain instances puncture may be made for diagnostic purposes, but it is better to advise laparotomy for the purpose of drainage, or if possible enucleation may be practised."

Statistics show incidence of the disease to be about equal in both sexes. It occurs most commonly between the ages of thirty and forty years, but may occur at any age. Trauma appears to be a factor in many cases. Treatment is surgical. The five methods most commonly employed are: (1) aspiration; (2) incision and drainage; (3) marsupialization; (4) resection of the affected portion of the bowel and cyst, followed by an anastomosis; (5) enucleation. The latter in my opinion is the operation of choice where possible.

The following case was operated upon by the writer on June 13, 1927.

Mrs. A. W. H., aged thirty-eight, born in Scotland; occupation cook, married February, 1927, never pregnant; well nourished, weight about normal, good colour.

Family history. — Father died at sixty-three of pleurisy; mother died at seventy of internal hæmorrhage (origin unknown); two brothers and one sister alive and well; one sister died of heart and lung disease.

Personal history.—She was quite healthy till 1925, when she had recurring attacks of dull aching pain located in either iliac region, following any physical exertion. The pain ceased after rest. Later, she noticed that her abdomen was gradually increasing in size. This progressive enlargement continued throughout the next year, until it resembled a pregnancy of seven months' duration. Early in 1927 she had attacks of nausea and vomiting at intervals, felt depressed, and was easily tired. There was some irritability of the bladder, probably the result of pressure, as the urine was normal. The bowels were sluggish in their action. In the month of April, 1927, she stumbled and fell, causing abdominal pain, after which the tumour increased more rapidly in size and she was persuaded to consult a doctor regarding her condition. The tumour was smooth, fluctuating, and not tender on pressure. The symptoms resembled pregnancy in some respects. This, however, was ruled out for the following reasons: the tumour was more freely movable than that of normal pregnancy was situated higher in the abdomen; there was absence of the fœtal heart sounds and uterine souffle; and a history of too recent marriage; pelvic examination also revealed the non-pregnant uterus crowded down into the pelvis; menstruation had recurred regularly though somewhat profuse. A cervical polypus was found, which might account for part of the blood loss. Blood-pressure: systolic, 120 and diastolic, 80. Teeth and tonsils negative. A diagnosis of cystic tumour was made, possibly ovarian in origin, and operation was advised.

Operation.—Median incision. A tumour was found, freely movable, lying between the layers of the mesentery near the root of the ileum. The ileum was arched over it, so that two inches of mesentery intervened between them. The tumour so completely filled the abdomen that it was decided to insert a trocar and cannula and empty the cyst by suction before attempting to remove it. The nature of the cyst was at once determined when the fluid was seen in the glass receptacle. It resembled thick cream in appearance and consistency. The total amount measured eighty-five ounces. The cyst was oblong in shape, the size of a man's head, with a smooth surface, creamy white in appearance with large vessels traversing its wall. The surface was inflamed in places, and the wall varied in thickness from one-quarter to one-third of an inch. There was a definite pedicle, attached at the root of the mesentery which was transfixed and tied before the removal of the sac. Resection of the tumour and attached ileum was first contemplated, as it was thought that damage to the mesenteric circulation by so wide dissection of tumour might cause gangrene of the bowel. Careful examination, however, revealed a line of cleavage between the peritoneum and the cyst wall, and the peritoneum was stripped off and used to cover in the raw surface later. The cyst was then separated from the other leaf of the mesentery without much damage to the vessels. The lower leaf of the mesentery was replaced in position and a row of catgut sutures inserted round its margin. The wound was closed in the usual way without drainage.

The cyst was examined by Dr. A. Y. McNair, pathologist of St. Paul's Hospital, and his report, under date of July 5, 1927, is as follows: "*Gross Examination*: cyst wall which has been opened, covered by a large number of fibrous tags; in places the wall shows extensive hæmorrhage into it. Hæmorrhage is very largely petechial in character. In places it shows small areas flecked with yellow. The average thickness of the wall is approximately 0.25 cm. The contents of the cyst are yellowish pink in colour. The amount of fluid contained is 85 ounces, containing a small amount of blood and a very high percentage of fat. The content has the appearance of chyle. There are several small additional masses which have the appearance of mesentery.

Microscopic examination.—The cyst is lined by what appears to be a flattened layer of cells, underlying which is a moderate cellular infiltration with round cells and plasma cells, and a few polymorphs. Wall is chiefly composed of fibrous tissue with a few split and separate muscle fibres scattered throughout. Wall is very vascular and shows a marked œdema. Contents of the cyst sterile; no tuberculosis was found; cellular content was very low, showed a few mononuclear cells. Character of the fluid; chyle.

Diagnosis.—Chylous cyst."

The patient made an uninterrupted recovery and left the hospital in two weeks. She reported at my office on October 18, 1927, in excellent health. Weight normal and digestion normal.

TRAUMATIC THROMBOSIS OF THE MESENTERIC VESSELS

Osler,[3] under "Mesenteric embolism and thrombosis," states that "When the mesenteric vessels are blocked by emboli or thrombi the condition of infarction follows in the territory supplied, which may pass on to gangrene or to perforation and peritonitis.

If the superior mesenteric artery is blocked the result is fatal. In the veins the thrombosis may be primary, following infective processes

in the intestine, particularly about the appendix, or it occurs in cachectic states. Secondary thrombosis is met with in cirrhosis of the liver, syphilis and pylephlebitis, or may result from the stasis caused by arterial emboli. Two groups are recognized: acute and chronic. In the former the onset is sudden with colic, nausea, vomiting and bloody diarrhœa, so that the picture is one of acute obstruction. The abdomen becomes distended and death occurs in collapse within a few days. In the chronic cases the onset is insidious and there may be no symptoms referable to the abdomen. Of 214 cases 64 per cent were in men. The diagnosis is extremely difficult and the acute cases are usually regarded as obstruction. In J. W. Elliott's successful cases forty-eight inches of bowel were resected."

Keen[4] in his book on surgery refers to the above condition as follows: "Frequency—As to the relative frequency with which the artery or veins are involved, Corner states that blockage of the arteries is more common than that of the veins, in the proportion of five to one, and that the involvement of the superior mesenteric artery bears as high a proportion as about forty to one to that of the inferior mesenteric artery. This proportion may be an exaggerated one, however, since it is made from a study of only the fatal cases.

"If we look to the blood-supply of the intestine, we will find substantial reason for the superior mesenteric artery being the seat of the embolism in the great majority of cases. The superior mesenteric through its branches, the inferior pancreatico-duodenal, the middle colic, the right colic, the ileocolic, and the terminal branches to the cecum and appendix, supplies no less than twenty-five feet of intestine and affords the blood-supply to that region. The inferior mesenteric supplies only the descending colon, not even the rectum, which has several sources of vascular supply.

"*Etiology.*—All those conditions which lead to thrombosis of the other vessels may be factors in the causation of thrombosis of the mesenteric arteries and veins. Arterio-sclerosis, endocarditis, atheroma of the aorta, are the most common causes of arterial thrombosis. According to Corner, it is most common in men past middle life and secondary to valvular disease of the heart, especially mitral disease. As to venous thrombosis, this may be primary or secondary to thrombosis of the portal veins. Delatous reported a case in which the thrombosis of the mesenteric vein developed during the post-operative convalescence after splenectomy.

"*Pathology.*—In the majority bloody fluid will be found in the peritoneal cavity, the mesentery will be swollen and œdematous with hæmorrhages of various sizes between its layers, the mesenteric glands may be enlarged. The intestine itself will present the appearance of one or the other stages of gangrene. The extent of the gangrenous area varies according as the inferior or superior mesenteric vessels are involved, and as the main trunk or one of its branches is the seat of obstruction. In a case reported by Ballance the entire small intestine from the commencement of the jejunum to the cecum was involved. The thrombus had originated in the superior mesenteric and extended into the portal vein. On the other hand, more especially in the large intestine, a comparatively small section may be affected. Gangrene, however, is not always the sequel of a hæmorrhagic infarct. There are cases in which the collateral circulation becomes established and resolution follows. The size of the infarct does not always affect the prognosis. A very small infarct may lead to gangrene and perforation, while an extensive one may undergo complete resolution.

"*Symptomatology.*—The initial symptom is pain, sudden in onset, usually diffuse though often localized, constant but with acute exacerbations. The intermittent character of the pain is attributed by some to intestinal contraction, although Schnitzler believed it to be due to the local anæmia that would follow the effect of a weak heart upon the blood-pressure. The early symptoms are not unlike those of acute intestinal obstruction, pain of a paroxysmal character associated with reflex nausea and vomiting. The vomitus is at first the normal contents of the stomach, but later becomes bile-stained, stercoraceous, and, if the lesion is high up in the small intestine, bloody. One of the most characteristic and significant symptoms is the passing of blood. Among the symptoms which are less constant should be included rapidity of the pulse, extreme and unaccountable restlessness and excitability, leukocytosis, and glycosuria.

"*Diagnosis.*—The condition which it most resembles is intussusception."

XUM

The following case was operated upon by the writer on March 12, 1927.

Mrs. J. F. M., aged sixty years, housewife; a very active energetic woman giving a history of good health up to about two years ago when hysterectomy was done because of the presence of chronic ulcerative endocervicitis and severe prolapse of the uterus. The result was satisfactory. She was in excellent health until December last when she had a fall, injuring her lower spine slightly, followed by nagging pain in the back for which she took some treatments from a local chiropractor. During her last treatment on the afternoon of March 11, 1927, she mentioned to him that she was troubled with constipation. The chiropractor therefore gave her abdomen as well as her spine a severe pommelling to relieve this. She states his massage (?) was so rough that she asked him to stop as she could not endure it. After leaving his office she boarded a street car and started for home. On the way she developed severe pain in the abdomen, became nauseated, and had to get off the car and get a friend to drive her home in an automobile. She went to bed at once, applied heat, took a laxative which she fortunately vomited, took an enema without result; she became distended, and felt so giddy and faint that she thought she was going to die. About 8 p.m., feeling worse, I was called to see her for the first time. On examination, I diagnosed acute obstruction of the small intestine and advised her to go to the hospital immediately for treatment. This she refused to do. Repeated enemata were tried without any result. No fluid or other food of any kind was taken, yet vomiting continued. The abdomen gradually became more distended and more tender; her pulse weaker and she was more acutely ill. Next day I saw her about 8 a.m., and hospital treatment was again urged but still refused. At 3.30 the same day she called me again, as her condition was alarming, and she was then admitted to the hospital. A blood count on admission showed marked leucocytosis. Blood was not noted in the motions in this case. Glycosuria too was absent both before and after operation. Restlessness and excitability were marked symptoms. A consultation was held with Dr. D. McLellan, and operation decided upon immediately.

At operation, on opening the abdomen, a considerable amount of blood-stained serum was found in the peritoneal cavity, also adhesions of the omentum to the intestines and abdominal wall. Warm laparotomy towels were attached to each side of the wound. The markedly distended portion of the small intestine was brought out on the towels in order to locate the affected area. This area comprised about eight inches of the lower ileum in a semi-gangrenous condition, dark purple in colour, of sausage-like consistency, and covered with bloody lymph. The eviscerated intestine was covered with towels wet with salt solution, which were changed frequently. The mesentery was swollen and œdematous. The mesenteric vessels leading to that area were stiff and cord-like, radiating almost like a fan in the hand. The thrombosed vessels extended from the intestine to the root of the mesentery.

It was decided to resect this portion of bowel and its affected mesentery, dividing the bowel well beyond the diseased area, so that about fourteen inches in all was removed. Lateral anastomosis was then done in the usual way, using chromic catgut sutures throughout. The edges of the mesentery were brought together and sutured with plain catgut. Following this, a vertical opening was made in the intestine immediately above the anastomosis, half an inch in length, and a small Paul's tube inserted, with a piece of rubber tube, two feet long, attached. A purse-string suture was run round the opening in the bowel and tied once, to fasten the tube in the bowel. The distal end of the tube was placed in a vessel held by the nurse. The fingers of the gloves were then well lubricated with sterile vaseline, and the bowel picked up above the inflamed and congested area and stripped from above downward for a distance of about ten feet, thus stripping the accumulated toxic material from the distended bowel through the tube into the vessel held by the nurse. By this means a large amount of toxic material was removed and the distention markedly reduced. The Paul's tube was then removed and the opening in the bowel closed. The abdomen was closed without difficulty and without drainage. She was given sodium citrate by the mouth during her stay in the hospital, to reduce the coagulability of the blood.

The report of Dr. H. H. Pitts, pathologist of the Vancouver General Hospital, was as follows: "*Macroscopical examination*: Specimen consists of about fourteen inches of bowel, deeply congested; mesentery very deep reddish-purple. On opening the bowel, the mucosa and walls are seen to be very deeply congested. The fringe of the attached mesentery is very deeply congested throughout, of a deep purple colour, and on section, practically all vessels show evidence of thrombosis.

Microscopical examination.—Sections through the bowel wall show some loss of the mucosa with very marked hæmorrhagic extravasation throughout all the coats of the intestine, with definite inflammatory cell infiltration throughout and evidence of beginning degenerative changes, chiefly in the serosa and subserosa. None of the thrombosed vessels, however, were included in the sections examined.

Diagnosis.—Early necrotic gangrenous changes in intestine, due to thrombosis of mesenteric vessels."

The patient made an uninterrupted recovery following the operation, and has been able to resume her household duties after the elapse of two months' time. I saw her recently, some seven months after the operation, and she states she is enjoying good health.

According to leading authorities, the mortality in these cases is very high.

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A REPORT OF A CASE OF CONGENITAL MALFORMATION OF THE GASTRO-INTESTINAL TRACT*

BY A. B. LEMESURIER, M.B., AND F. F. TISDALL, M.D.

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Congenital malformations of the gastro-intestinal tract are encountered comparatively frequently, and usually fall into fairly well-defined groups. The group in which the abnormality consists in a fault of rotation is a large one, but the part affected is nearly always

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the colon, which has failed to pass to the right side. The other organ that rotates — the stomach—practically invariably rotates to the left, and any deviation from this plan is for some reason so very rare that the following case is reported.

Lillian L., aged 3 weeks, was admitted to the Hospital for Sick Children, May 12, 1927, on account of projectile vomiting. Nothing abnormal had been noted until 16 hours previous to admission when the patient started to vomit. Since then, she had forcibly vomited not only all her feedings but also any water administered. The patient was a full-term infant, with a birth weight of 8 pounds. The labour had been normal. She had been breast fed irregularly about every 2½ hours; ten minutes on both breasts at each nursing and had appeared quite satisfied. There had been 3 to 4 normal stools per day.

On admission to hospital, the infant did not appear acutely ill. She was well developed and well nourished. Definite projectile vomiting was noted, the vomitus being markedly bile-stained. Slight peristaltic waves were occasionally observed in the upper part of the abdomen. No tumour could be felt in the usual region of the pylorus. Neither the liver nor the spleen was palpable.

The patient was given one ounce of breast milk every 4 hours preceded by 1/750 grain of atropine sulphate by mouth. During the two days following admission (May 13-14) she vomited after every feeding. Frequently the vomitus consisted of a large amount of yellowish-green fluid. On May 15th, the breast milk was stopped and a 15 per cent sugar solution consisting of equal parts of dextri-maltose and cane sugar was given *ad lib*. The vomiting practically ceased and on May 17th the breast milk was resumed. On May 20th it was increased to 1½ ounces at each feeding and on May 21st to 2 ounces. Very little vomiting occurred until May 24th when the patient again started to vomit after every feeding. The food was reduced to one ounce. Projectile vomiting still persisted and on the following day the breast milk was stopped and the sugar solution again given. In spite of this a large amount of greenish fluid was vomited 5 to 7 times a day until a laparotomy was performed. From May 12th to May 31st, the patient's weight diminished from 8½ to 7½ pounds.

A barium meal was administered on May 27th. Dr. A. H. Rolph of the x-ray department reported that the stomach was transposed so that its fundus lay in the upper right quadrant and its pyloric end in the upper left quadrant. The organ was considerably distended and the passage of the meal through it was markedly retarded. The heart was in its normal position on the left side.

No definite diagnosis could be made except that the stomach was on the right side and that the child was suffering from an intermittent intestinal obstruction, high up but below the entry of the bile duct. On May 31, 1927, an operation was undertaken in an attempt to relieve this obstruction As the condition of the child was rather precarious, the operation was hurried and the examination of the organs necessarily incomplete. Enough, however, was made out to give us a general idea of the abnormality present, particularly as it affected the alimentary tract.

The liver extended completely across the abdomen beneath the diaphragm and appeared to be more or less symmetrical. The terminal inch of the œsophagus was seen near the midline, running from left to right, and emptying into a large distended sac which occupied the greater part of the right upper abdominal quadrant. The sac resembled the stomach in shape but was transposed so that its fundus and greater curvature lay to the right. It must have comprised both stomach and duodenum because the common bile duct could be seen entering it near the lower end of its lesser (left) curvature. There was, however, no constriction or thickening of its wall to indicate the position of any pyloric sphincter. The spleen, about normal in size and shape, was on the right side, in relation to the fundus of the stomach. The pancreas was not examined.

The bile-duct, running from the liver to the lesser curvature of the distended sac, lay in the free edge of a peritoneal fold, the lesser omentum. Behind this was an opening about three inches in diameter, the foramen of Winslow, leading to the right into the lesser peritoneal sac which, in this case, was unusually large, occupying all the space behind the

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stomach and extending for some distance below it.

The greater part of the stomach and duodenum had a mesentery and was freely movable. The terminal portion of the duodenum, however, was fixed to the posterior wall near the mid-line in much its normal manner. From there the proximal portion of the jejunum ran sharply upwards and to the right, producing at the duodeno-jejunal junction an acute kink, fixed by an avascular membrane joining the two limbs. The jejunum rapidly passed into the foramen of Winslow, and, emerging from the foramen, above the jejunum, could be seen the terminal portion of the ileum. None of the rest of the small bowel was visible,

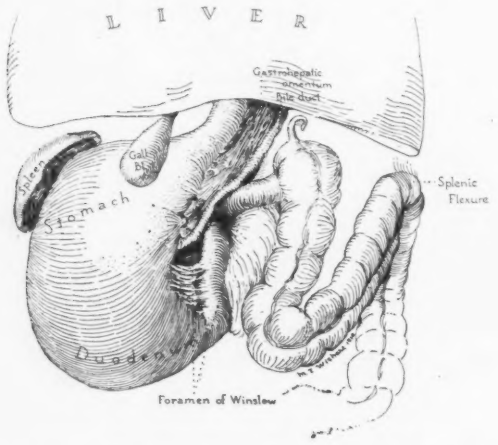

FIG. 1.—Abdominal viscera viewed from the front, before withdrawal of small intestine from lesser peritoneal sac.

the whole of it being herniated through the foramen and lying in the lesser sac behind the stomach and below it, on the right side of the abdomen.

The colon was altogether on the left side. The cæcum and appendix were situated high up and were upside down. What would normally be the ascending colon ran downward, and the transverse colon ran upward, all of them having a long mesentery and being freely movable. The splenic flexure was fixed and, with the rest of the colon was normal in position.

The small intestine was readily pulled out of the lesser sac, no adhesions being present. It appeared to be normal in length, but the base of its mesentery ran downwards and to the left and the superior mesenteric artery lay behind the duodenum instead of in front of it.

There seemed to be no obstruction resulting from the hernia into the lesser sac. It was, however, thought wise to close the foramen of Winslow, which was easily done by suturing the lesser omentum to the posterior parietal peritoneum. The kink at the duodeno-jejunal junction was obviously the cause of some obstruction, and was readily straightened out when the velum holding it was divided. No difficulty was experienced in returning the bowel within the abdomen. The wound was closed in layers, and at the completion of the operation the child was transfused.

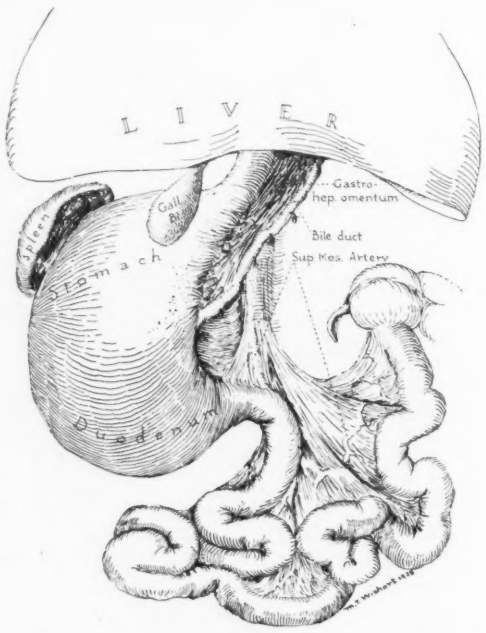

FIG. 2.—Abdominal viscera viewed from the front, after withdrawal of small intestine from lesser sac.

The improvement after operation was slow. Occasional vomiting occurred for some days but it was usually small in amount and not projectile in type. The patient was given breast milk at first then later a mixture of butter soup and lactic acid milk, 3 ounces every 3 hours, seven feedings daily. She was discharged on July 30th having vomited only 3 times in the previous 2 weeks. The infant has been examined at intervals since her discharge, and now on February 7, 1928, at the age of 9 months her weight is 19 pounds. There had been practically

no vomiting or other signs of obstruction and she had all the appearances of a normal infant.

Further roentgenograms by Dr. A. H. Rolph on November 16, 1927, showed the stomach in the same position but considerably smaller than before operation. The barium meal passed more quickly but at the end of 6 hours there was still a small residue in the stomach. The barium enema showed a marked change in the position of the colon. Instead of lying in its former situation altogether on the left side, it had apparently undergone normal rotation and now lay with the cæcum and ascending colon in their proper positions on the right side.

DISCUSSION

This is not a true case of situs inversus with the whole body presenting, as it were, the mirror image of what it should be. The heart here is in its proper position on the left side, and, as far as could be made out the abnormality is limited to the alimentary canal and to those organs connected with it in the course of its development. The fault seems to be primarily one of rotation. Commencing with the stomach, the rotation was the reverse of the normal process, and its greater curvature, which was at first posterior, passed to the right instead of to the left. The spleen, developing in the dorsal mesogastrium came to lie on the right side. The liver, instead of being pushed by the stomach to the right and failing to develop in its left half, had developed about evenly on the two sides. The small bowel had entered the lesser sac through an abnormally large foramen of Winslow, probably at the time of its return from the umbilical loop, and with the stomach had apparently so filled the right side of the abdomen that the normal rotation of the colon to the right had been interfered with and the superior mesenteric artery had not been carried across the duodenum. The origin of the velum and kink at the duodeno-jejunal junction is not clear, but the obstruction so produced was obviously the cause of the distension of the stomach and duodenum with the resultant vomiting. Since the operation the normal rotation of the colon has taken place. The factor that has permitted this is probably the removal of the small bowel from its former position on the right side in the lesser sac.

A CASE OF ABDOMINAL TORSION OF THE GREAT OMENTUM

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Abdominal torsion of the great omentum has received a considerable amount of attention in the current medical literature, and a fairly large number of cases have been recorded since Marchetti first reported one in 1851. It is afforded, however, but scant attention in a few, and not mentioned at all in the great majority of, surgical text-books, as a differential diagnosis in appendicitis and cholecystitis, for which diseases it is most frequently mistaken, because the strangulated portion of the omentum nearly always lies to the right of the mid-line.

In searching the records of the Montreal General Hospital since 1910, I have only been able to find two examples of this condition; one a woman, aged 40, admitted to the service of Dr. E. M. Eberts in 1924, with a diagnosis of acute appendicitis and operated upon by Dr. R. B. Malcolm; and this case which I beg to report herewith.*

H. A., a Canadian by birth, 34 years of age, was admitted to the Montreal General Hospital, on March 8, 1927. He was complaining of pain in the right side of the abdomen and vomiting. The pain, which was epigastric at first, localizing within twelve hours in the right lower quadrant, started on March 1st, one week before admission. It was always steady in character. The patient was nauseated and his bowels did not move. He remained in bed from the onset, with no relief, and on March 3rd he was first seen by a physician, who applied an icebag to the abdomen. On the next day the pain was slightly better, but he was still nauseated and his bowels did not move in spite of purgation. From March 5th onwards the pain steadily increased in severity, and on the 7th, the day before admission, he vomited twice and his bowels moved once.

He was a sailor by occupation, and, except for an operation for bilateral inguinal hernia in another city five years ago, followed by recurrence six months later, his personal history

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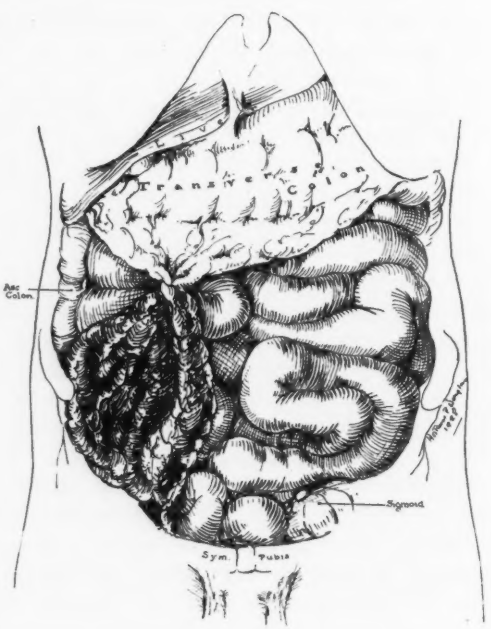
presented nothing of note. There was no history of previous similar attacks.

He walked into the hospital in obvious distress, a slight, sallow, very ill-looking individual, with a heavily coated tongue, a temperature of 99 2/5°, a pulse of 84, and respirations of 20. His abdomen was flat and in the upper half moved with respiration. In the right lower quadrant a definite mass was visible. On palpation, this mass was acutely tender and felt to be about the size of a grapefruit. It extended over to the mid line, upwards to the umbilicus, and into the right iliac fossa, but remained well above Poupart's ligament. It was slightly movable and dull to percussion. There was slight movable dullness in both flanks. The right rectus muscle was in moderate spasm throughout, but no rebound pain could be elicited. No other masses were palpable, neither was there tenderness elsewhere in the abdomen. Rectal examination revealed nothing abnormal. Bilateral inguinal herniotomy scars were present; both right and left external rings were patulous, and definite protrusion and impulse on coughing were noted on both sides. There was no mass nor tenderness over either the external or internal rings. His heart, lungs, and urine were negative, and his blood count showed a leucocytosis of 13,700. A diagnosis of appendicitis with an omental abscess was made, and under ether-anæsthesia the abdomen was opened through a right paramedian incision, displacing the rectus muscle outward.

On opening the peritoneal cavity a considerable quantity of blood-stained odourless fluid escaped, and the omentum, congested to a deep purplish red, presented. On passing the hand down over the omentum some light adhesions to the anterior abdominal wall were easily separated, and a tail of the free border was found adherent just at the margin of, but not within, the right internal abdominal ring. This adhesion was separated with some force and the mass was brought up into the wound. It was now found that the cæcum and appendix were quite separate from the strangulated omentum and innocent of infection. A spiral twist from right to the left, which could not be undone, was found near the base of the omentum and this organ was ligated above the twist in four interrupted ligatures and the strangulated portion, consisting of all but the upper one and one-half inches, was amputated by the thermocautery. Several soft adhesions between the posterior surface and loops of small bowel were separated and the mass delivered. An uninflamed appendix was removed, and exploration revealed no disease elsewhere in the abdomen. The wound was closed without drainage, and the patient was discharged on the eighteenth day after an uneventful recovery, with instructions to return for repair of his herniæ in two months.

The portion of the omentum removed, which was roughly triangular in shape, measured 5 by 9 by 10 cm. The large veins were thrombosed and the fat deeply engorged, purplish-red in colour and presented several areas of definite gangrene at the margins.



COMMENT

Cases of torsion of the great omentum may be divided into three groups:—

1. Those which have no apparent cause.
2. Those associated with inflammation of some abdominal organ.
3. Those associated with hernia.

Clinically, all three types present the same symptoms and demand the same surgical treatment. The first class is however, by far the

rarest. Up to 1925, when Ernest Crowell,[1] of Croydon, published a very complete article on this subject in the *British Journal of Surgery*, there were only eighteen cases to be found in the literature since 1882. Since then eight cases have been reported, the latest being two by McAuley,[2] of Dublin, and one each by Foster, of New Zealand, and Reid, of Bournemouth, all in the *British Journal of Surgery* for January of this year.

Of those associated with hernia, there are over one hundred and forty cases on record.

It is interesting to note that in all these cases, whether associated with hernia or not, a preoperative diagnosis of either appendicitis or cholecystitis was made, and in each the surgeon notes, with emphasis, the escape of bloody fluid on opening the peritoneum. In some cases only a small portion of omentum may be twisted and lie beyond reach of the examining finger, should the abdomen be opened by the McBurney incision. It is under these circumstances that torsion of the great omentum as a cause of bloody fluid in the peritoneal cavity should be particularly remembered.

The cause of this condition is rather obscure. Of course with a tag adherent at the hernial ring, as in the case I report, with the omentum fixed at both ends and swinging between like a skipping rope, it can readily be conceived how it may be twisted by posture or abnormal movement; the venous engorgement which rapidly ensues, preventing its return to the normal position. Jaboulay corroborates this view. Bazy attributes it wholly to increased peristalsis, whereas Payr considers it due to the anatomical arrangement of the vessels, when following venous congestion the arteries twist spirally. Whatever the cause may be, it yields readily to surgical interference, the death rate being about 5 per cent in the cases collected, which date from 1882.

An elaborate differential diagnosis from acute appendicitis has been worked out, but since appendicitis is a disease which embraces so wide a variation in signs and symptoms, and since it is an infinitely commoner cause of right-sided abdominal inflammation and tumefaction, it seems to me that while one might hazard a lucky guess, one could not open the abdomen in an individual presenting the signs and symptoms of intra-abdominal torsion of the great omentum confident that the appendix was not primarily at fault.

In conclusion, it would seem that torsion of the great omentum ought to be considered in the differential diagnosis of right-sided abdominal inflammation, and when the abdomen is explored, should blood-stained fluid escape on opening the peritoneal cavity, the possibility of torsion of the great omentum should be borne in mind.

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Reviews and Retrospects

BACILLUS CALMETTE-GUÉRIN (B.C.G.) IN PROPHYLACTIC IMMUNIZATION IN CHILDREN*

AN ANALYSIS AND CRITICAL REVIEW

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The occurrence of tuberculous infection among children in the civilized world, as demonstrated by the tuberculin skin test, has been one of the main topics of discussion for many years among the epidemiologists. In Paris 35 per cent of apparently healthy children up to the age of five give a positive tuberculin reaction. Similar findings have been reported in Vienna, Berlin, the rural districts of Germany, Munich, Dantzig and Düsseldorf. In the United States and Canada the incidence of infection as detected by the tuberculin reaction is not so great as that reported in European countries. The figures reveal the fact that by the time children reach the age of puberty, they may become infected in from 40 to 90 per cent, the social and economic conditions particularly influencing the percentage of infection.

From the statistics of early infant infection, which has stimulated the present activities for prophylactic immunization, it seems that infants are born with no appreciable resistance

* Abstract from the original article.

to an excessive infection. If they are born in families in which tubercle bacilli are disseminated continuously, infection will probably take place almost immediately; excessive infection taking place more often from contact with a tuberculous mother, and leading to a progressive disease which terminates either in meningitis or miliary tuberculosis. On the other hand, if they come in contact with only a few organisms and at proper intervals, serious consequences are avoided.

Under ordinary circumstances, and not in tuberculous surroundings, doubtless children occasionally pick up a few organisms which find their way to the lymph-nodes, setting up a small, non-progressive focus, which according to the majority of investigators is responsible for a degree of resistance to progressive disease present in the human race. Statistics show that the percentage of positive tuberculin skin reactions increases with age and conversely the mortality from tuberculosis diminishes as the child becomes older.

It would seem then, according to Calmette, that an infection of mild nature is very desirable, but the intervals should be well regulated and excessive infections avoided. The organism used for producing mild infection should be of low virulence and the vaccination must be carried out in infants which have not been infected. The vaccination must be repeated from time to time in order to supply the lymph nodes with living organisms. Calmette is convinced that most of the infection in children takes place by the digestive route, for the reason that the intestinal mucosa of the infant during the first ten days absorbs the organism much more readily than at any other time during life. For this reason he uses the same route for vaccination, the organisms being fed to newborn infants.

Since the discovery of the tubercle bacillus by Robert Koch many attempts have been made to produce prophylactic immunization against tuberculosis. To-day there are three methods which most demand our attention, *viz.*: Vaccination with (1) living virulent, (2) living avirulent, and (3) heat-killed virulent tubercle bacilli. In this paper, however, we have limited our discussion to the method advocated by Calmette and his co-workers at the Pasteur Institute in Paris, which consists of vaccination with avirulent living organisms.

Bacillus Calmette-Guérin (B.C.G.) which is the organism used by Calmette, was isolated some fifteen years ago from a heifer. At that time it was pathogenic for cattle, rabbits and guinea pigs, but after continuous subculturing on glycerin-ox-bile during this period, the organism has lost its pathogenicity almost entirely but still produces local lesions which eventually heal. For the last five years B.C.G. has been used extensively in European countries, and mainly in France, for vaccinating children with the object of attaining prophylactic immunization. The increasing use of Calmette's method of vaccination and the questions it has raised have called forth this review of the literature on the subject and a report of our own experiences with this organism.

An important factor entering into the discussion when living micro-organisms are used for vaccination is: Is the method dangerous? According to the majority of workers, B.C.G. is innocuous for small laboratory animals, the lesions having a tendency to heal. A few investigators, however, have been able to establish progressive disease in guinea pigs using this organism, eventually leading to the death of the animal. Our experience with this bacillus leads us to believe that generally speaking it is innocuous but occasionally, for some reason or another, infection leading to the death of the animal does take place. We have been able to produce tuberculosis only in few animals with the straight undissociated bile cultures.

An explanation of these variations on the virulence of this organism is offered by the recent work on dissociation which has been observed in the majority of bacterial species. Recently we have observed that any culture of tubercle bacillus may contain two types of colonies which can be differentiated by their cultural characteristics and virulence for animals. We have found two types of colonies present in a culture of B.C.G., one "R" colony, which is non-virulent, and the other "S" which is virulent for guinea pigs. The "R" colony grows well on glycerin-bile potato and Sauton's media, while the "S" does not produce any visible growth in bile but grows in Sauton's. The latter, however, does not die in the bile medium. Scrapings made from the surface of the inoculated culture after one to two months incubation, invariably produce progressive tuberculosis in guinea pigs, involving the lymph nodes and the viscera. The lesions are similar to those seen in guineau pigs inoculated with bovine tubercle bacilli. These scrapings will also yield a profuse growth after cultivation on suitable egg media. From the lesions of this S colony we believe that B.C.G. has still the earmarks of a bovine organism but lacks the power of producing progressive tuberculous lesions in rabbits. By continuous subculturing on potato bile media, Calmette has gradually eliminated most of the S colony, allowing the R to predominate. The virulent S colony, however, has never been completely eliminated and although present in very small numbers, under favourable conditions it may increase in number to such an extent that reversibility of virulence may take place.

Calmette's original cattle experiments in 1913 are open to criticism. He only uses one control in each group with seven or eight vaccinated animals. The statement is made that 3 mgm. of the Vallée bovine strain invariably killed the control in five weeks of generalized tuberculosis, while the vaccinated continued in good health. Watson, however, using the same Vallée strain, observed that some control calves which had been inoculated intravenously with 250 mgm. of the organism and killed eleven months later showed only lymphatic tuberculosis. Did Calmette use identical suspensions in his control in each experiment, or did he assume from previous experiments that the Vallée strain always killed in this dose? We now know that unless we cultivate our human H37 and bovine B1 tubercle bacilli on suitable media the virulence diminishes. For this reason when testing the resistance of vaccinated animals the same number of controls must always be used. We suggest that the success reported by Guérin in cattle experiments was not due to the protection established by vaccination with B.C.G. but to the elimination of the contaminators on the one hand and to the development of natural resistance on the other.

The animal experiments submitted as the basis of vaccination with B.C.G. are unsatisfactory. There is, at most, only weak evidence to show that this organism establishes any appreciable degree of protection in small laboratory animals, the only evidence being that some of the vaccinated animals outlived the controls. Selter believes that some degree of protection can be established but this is due to the slight degree of virulence still present in the organism. The experiments on monkeys seem favourable and should be repeated on a larger scale by other observers. We are inclined to believe that the protection conferred by B.C.G. is very slight and not greater than that obtained with heat-killed organisms where there can be no question of danger. The life cycle of the tubercle bacillus is not completely understood and especially that of B.C.G. We consider its use, at least for the present, should be deferred.

Vaccination of Children.—The history of the vaccination of infants with B.C.G. as a prophylactic measure dates from July, 1921, when Turpin and Weill-Hallé fed some infants at the Maternity Hospital in Paris. For the following two years the vaccination was practically neglected. It was not taken up seriously until July 1, 1924. In a recent article Calmette and his co-workers tabulate the results from the three years' vaccination of 52,772 children, which cover a period from July, 1924 to December 1, 1927. Eight hundred and forty infants were vaccinated in 1924, 4,336 in 1925, 14,654 in 1926 and 32,942 in 1927. Six thousand two hundred and nineteen of the vaccinated were born in tuberculous families, 5,749 of whom have been under observation for from 1 to 3½ years. Of these 3,808 were vaccinated less than one year, 118 of whom died, making a general mortality of 3.1 per cent and a tuberculous mortality of 34 infants or 0.9 per cent. Tuberculous meningitis is given as the cause of death in 30 cases or 88.4 per cent of the tuberculous deaths. The remaining deaths were due to some other form of tuberculosis. Of the 84 infants in this group who died from other causes than tuberculosis 29 or 34.5 per cent died from gastro-enteritis.

The remaining 1,941 of these 5,749 infants represent a group from 1 year to 3½ years of age. Twenty-one deaths occurred in this group, or a general mortality of 1.2 per cent, four of whom, 0.2 per cent, died from tuberculosis. In the third group of 917 children from 2 to 3½ years of age there was no tuberculous mortality. It is not quite clear if the third group is included in the second group.

Perhaps the best controlled study on infant vaccination is that made by Weill-Hallé and Turpin. Their statistics consist of 469 cases vaccinated with B.C.G. Of this group they analyzed only 317 cases which were well followed with the intracutaneous skin test. The remaining cases were either lost track of or excluded because the duration of time after the vaccination was too short. Of these 317 infants 236 were from healthy surroundings and 67 from tuberculous environment. Deaths occurred in 14 instances and were divided equally between the two groups, seven in the first and seven in the second. The figures given on the tuberculin skin reaction show that a positive reaction occurred more frequently in the group of children which were in tuberculous surroundings than in the group in which apparently there was no source of infection. Sixty per cent of children at the age of two years living in contaminated surroundings have reacted positively to tuberculin. This probably means that a large percentage of infection in this group was of exogenous character. It does not vary in any way from the group of children who have never been vaccinated and have lived in tuberculous surroundings. It seems that in spite of the vaccination with B.C.G. and the sociological measures, the implantation with virulent bacilli has taken place.

The favourable reports coming from Europe on the vaccination of newborn babies are so amplified that they have reached the point of distortion. Careful analysis of the statistics submitted reveal one outstanding fault, *viz.*, that not a single group of vaccinations has been controlled. We have failed so far to find comparable figures which may lead us to some conclusion.

Mortality rates from tuberculosis in infants, in one instance, are quoted as far back as 1889. Have not the conditions and our knowledge of sociological measures been improved in recent years so as to bring the mortality to a lower level? Calmette claims that in France he has reduced the mortality from tuberculosis in the first year of life from 25 per cent before the vaccination to 0.9 per cent after the vaccination. Does this 25 per cent mortality in infants in tuberculous families refer to the group of known infected as detected by the positive tuberculin reaction, or does it represent a percentage from the general mortality? It is not quite clear in our minds.

It must be remembered that most of the vaccinated children born of tuberculous mothers were removed from contact for at least four months, thus decreasing the possibility of an infection in this early period of life. This isolation gives the infants an opportunity to adjust the normal mechanism of defense against any infection. No infants in France without vaccination have been submitted to a similar preventive measure early in life. How then can we compare the two groups, the vaccinated and the non-vaccinated? Two factors are involved in these studies, vaccination and hygienic preventive measure. Further, how can we determine the cause of death in infants from tuberculosis without post mortem examination? There are other forms of tuberculosis in infants besides tuberculous meningitis which are not easily diagnosed. Calmette presents only three autopsies, involving a study of several hundred deaths. Very many of the vaccinated infants have died of gastro-enteritis, in fact, over 30 per cent of the deaths occurring in the vaccinated infants not due to tuberculosis have been recorded as gastro-enteritis. Could it not be possible that in some this gastro-enteritis was of a tuberculous nature? While it is probable that the organism, by feeding, may find its way into the mesenteric lymph-nodes and then be distributed throughout the body, it is conceivable that when such large doses are administered at birth the mucosa may become involved directly. The innocuousness of the organism has been based on the observation that no fatalities have been reported after oral vaccination. Fortunately, contrary to Calmette, the experimental evidence is against any great danger of infection taking place by this route. The only misgiving we have is that some virulent type (S) may be carried along with the non-virulent.

Weill-Hallé observed only 2 per cent positive tuberculin reactions up to three months in a group of infants vaccinated by the oral route and living in healthy surroundings. When the vaccine was administered subcutaneously 100 per cent of the infants reacted intracutaneously to tuberculin. Is this not sufficient proof that very few of the organisms pass through the intestinal mucosa of the infants?

In explaining the 0.9 per cent mortality from tuberculosis in infants vaccinated with B.C.G., Calmette and Surrez do not, as a rule, attribute it to an infection of exogenous character subsequent to vaccination. They profess to believe that tuberculosis occurred in these infants usually as a result of fœtal infection with the ultramicroscopic filtrable form of the tubercle bacillus which traversed the placenta, a theory which is still a speculation. In our laboratory we have not yet confirmed the existence of a Berkefeld filtrable form of the tubercle bacillus.

The main object of the present campaign in prophylactic immunization has been to reduce the mortality from tuberculosis during the first year of life. Since the adoption of vaccination with living organisms there is evidence that the general mortality has been reduced, and there are indications that some of the infants have been infected, while others, regardless of the prophylactic measures and vaccination, have been re-infected with small numbers of virulent organisms.

It seems advisable, and a much safer procedure, not to introduce another living organism into the body but rather, by hygienic measures, to eliminate as much as possible the danger of excessive infection from the newborn babies. In the United States and Canada where the campaign against tuberculosis is made very effective by the use of various sociological and health measures, mortality and infection in childhood have decreased to a very low level and we cannot see why such a prophylactic measure as that advocated by the French investigators should be introduced at present. We believe that watchful waiting is the best position at present in reference to vaccination of infants. We cannot completely ignore the possibility of a prophylactic vaccination method and the one advocated demands our careful consideration The careless use of poor statistics obtained from a study of human beings will lead us nowhere. Therefore, we strongly advocate experiments in cattle on a large scale in order to confirm or refute Calmette's claims.

If you are entering the study of medicine in the hope of making out of it a fortune, forbear, but if you are going into it with the idea of studying earnestly how best you can help humanity, then go forward. — F. A. Cleland.

Editorial

WHAT IS A DIATHESIS?

THE word "Diathesis" is seldom met with nowadays. The index to the latest textbook on Pathology does not contain it. It was always a vague term, but it is safe to say that at the present time it is even vaguer. This is unfortunate, for the word is capable of doing useful service, if only the thought enshrined in it were more sharply defined, or, rather, perhaps, more fully apprehended.

In the past "Diathesis" has received several interpretations. Some regarded it as a disease in itself, a very chronic one indeed, manifesting itself by external signs which might crop out at sundry times and in divers places. The majority saw in it simply a predisposition to some particular disease or group of diseases. So they spoke of a "cancerous," a "hæmorrhagic," a "strumous" or an "arthritic" diathesis. The more scornful said the term "diathesis," like "idiopathic," was an assumption of learning to conceal ignorance.

A useful classification of the general causes of disease, not quite obsolete, is into "predisposing" and "exciting." Owing more particularly to the establishment of the germ-theory of disease, and the recognition of the important part played by the internal secretions and hormones, not to speak of the vitamines, attention has been focussed on the exciting or direct causes of disease, to the neglect of the predisposing or indirect causes. The latter have, therefore, been relegated undeservedly to the background. Into the discard, with "predisposition," went "diathesis." To-day the term "constitution" is more popular, and is used in the sense of "disposition," "predisposition," "idiosyncrasy," or "diathesis." It is evident, in all this, that while certain words may drop out of use ideas are more permanent, though it may be found necessary to restate them or even rename them. The resurrection of the old term seems worth while, and Sir Archibald Garrod saw fit to choose "Diathesis" as the title of his Huxley Lecture last year.

It is a matter of common knowledge that certain persons, families, and races are more likely than others to suffer from particular maladies, and it is on this fundamental observation that the doctrine of diathesis is based. In other words, in such cases we recognize a tendency or disposition to react unusually in certain directions. As a rule, when we use such terms we have in mind a lessened reaction to infection—susceptibility—but a little thought will show us that this is altogether too narrow a view. Tendencies in disease may, also, manifest themselves in anatomical defects, perverted functions, disturbed metabolism, immunity reactions, and even psychological phenomena. Numerous examples could be cited. The following are familiar;—polydactylism, colour-blindness, gout, diabetes, obesity, susceptibility to the exanthemata, migraine, hysteria, epilepsy, Huntingdon's chorea, and congenital familial amaurosis.

It is impossible to appraise and correlate the various aspects of the subject unless we have a clear idea of what constitutes disease. Disease is not an entity or multiplicity of entities which enters the body from without, is distinct from it, and can be separated from it, an idea that is illustrated in the old pathological concept of "demoniacal possession." It is really a vital process, a disturbed action of the bodily functions, due to faulty adjustment to the environment or the result of some internal dysharmony. Hence, it is logical to classify diseases as inherited and acquired. Similarly, tendencies to disease may fairly be regarded as inherited and acquired, though Sir Archibald Garrod, and probably most others, would restrict diatheses to the first group.

The inherited diatheses, like other heritable conditions, follow along individual, familial and racial lines, and, moreover, exhibit various degrees of extension. Thus, the tendency may show itself in the appearance of some one anatomical abnormality, such as polydactylism or inferior progna-

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thism. Again, the tendency may be towards one or more of a group of allied affections. Thus, one member of a family may suffer from acute rheumatic fever; another, from tonsillitis; a third, from pleurisy; and a fourth, from erythema nodosum. Or, the tendency may be so attenuated as to be without any specific character, and manifests itself merely as a general infirmity of constitution, whereby an individual or a family finds it eventually impossible to stand up against the ordinary vicissitudes of life, and so dies out.

The most important diatheses, from the practical standpoint, are the *metabolic* and the *nervous* (including psychopathic). In the former group we have such things as obesity, gout, hæmophilia, diabetes, cystinuria, alkaptonuria, and hæmatoporphyrinuria; in the latter, migraine, hysteria, epilepsy, neurasthenia and psychasthenia, Raynaud's disease, and various abiotrophies. Many of the metabolic diatheses are inheritances, due to peculiarities of the germ plasm, and some of them are sex-linked. Of this there can be no doubt. At the same time, there is evidence for believing that some diathetic inheritances are attributable to environmental influences, though this view runs counter, perhaps, to the current belief. No doubt, the more obvious, concrete and specific diathetic phenomena are pure inheritances and not acquirements resulting from external influences. It may be pointed out, however, that they are not always independent of environment. The diathesis may be entirely latent, and even unsuspected, until some change occurs in the patient's surroundings which brings it to light. For example, a person the subject of Raynaud's disease may not suffer from it so long as he remains in the tropics; when he removes to a cold climate his peculiarity at once becomes manifest. So, too, the asthmatic (neurotic type) may be clear until he come in contact with some particular kind of dust, or experiences a change in temperature or altitude. Some skin eruptions will only become evident when the patient is subjected to an excessive dose of ultraviolet rays. These external factors, thus, act like the percussion cap in exploding the main charge. But when we come to the more general peculiarities, including what have been termed by some "reversionary diatheses," it seems reasonable to conclude that untoward environmental influences may so affect the germ plasm that it may transmit enfeebled properties to the next and successive generations. Thus, alcoholism, syphilis, tuberculosis, vice, unhygienic surroundings, may so degrade the stock that we find an excessive number of abortions, still-births, monstrosities, idiots, mental and physical degenerates, and weaklings in certain families, tending, fortunately, to their ultimate disappearance. It is well to realize this, for it is in this type of diathesis, and in this alone, that science can be of much avail. We conclude, therefore, that some, the more general, diatheses may be acquirements, though it may take several generations before their manifestations become markedly evident.

Inasmuch as peculiarities of the orders of anatomical abnormality, perverted function, and susceptibility are the most striking, it has come about that the term "diathesis" has become restricted to these. But, if the term is to be resurrected, would it not be well to widen its scope so as to include those reactions of the body that are beneficial and protective? There is nothing in the etymology of the word to prevent this. "Diathesis" means merely a "state" or "disposition." This may be for weal as well as woe.

A. G. NICHOLLS

SANITARY ENGINEERING IN THE TROPICS

FIFTY years have not yet passed since Count Ferdinand de Lesseps attempted to construct a canal through the Isthmus of Panama. The project failed, not because the French were unskilful engineers, but, chiefly because man had not then gained the mastery over certain occult powers of the air. So soon, however, as medical research taught us how to banish yellow fever and malaria from the tropics, the way was cleared and the canal became a fact. Our knowledge of tropical diseases increases day by day, and the struggle to control them goes bravely on. Accordingly

we find, in Africa for example, districts formerly almost closed to the white man being opened up to his endeavour. There is a well-known saying, that "trade follows the flag." It is equally true to say that trade follows the physician. The work of the expert in tropical medicine and of the engineer is bringing about a marvellous transformation. The "white man's graveyard" is becoming his workshop, and may soon become his playground. We may, indeed, expect to see in western and central Africa 'the Conducted Tour,' and Sierra Leone advertised as 'a health resort.'

The intrusion of the white man into the domains of less civilized races has not always been to the advantage of the latter. Certain peoples, like the Marquesans, are said to be dying out in consequence of infection with white men's diseases. We have now, however, reason to hope that all this will soon be changed. To many places the white man is bringing sanitation, health, and healing. But, this result, so highly to be desired, will only be possible when sanitarian and engineer work in close co-operation. Unfortunately, this has not always been the case. It has happened that improvements in community planning, desirable enough in themselves, have been carried out without due regard to the health problems involved, and sometimes great engineering works have been found to promote the spread of certain tropical diseases.

To illustrate what is meant, we may take the building of the great dam at Assouan, undoubtedly a great boon to Egypt, designed to promote the irrigation of the Nile valley. It has been stated that since this work was completed schistosomiasis (Bilharziasis) has become more prevalent in the district affected. The explanation offered is this. The intermediate, and a necessary, stage of the development of the schistosomum takes place in certain freshwater snails of the genera *Bulinus* and *Planorbis*. In the old days the annual overflowing of the Nile carried these snails into pools and ditches in the surrounding fields. As the water was diverted, and was dried up by the sun, the snails perished. Now, however, irrigation is more continuous, the pools do not dry up, and the snails multiply and can more easily and widely spread the infection.

Again, the case of Nairobi, in Kenya Colony, may be cited as one of the great disappointments of hygienists. To quote Dr. Andrew Balfour, it is "an example of how a town should not be planned and built. . . .The Indian bazaar, foul, overcrowded, ugly, and menacing, remains in the middle of the town, a nursery for the plague and a blight upon the landscape." Here was a chance to found the capital of Kenya on a truly sanitary basis, to plan it in accordance with the teachings of modern science, and forever bar its gates against disease. The wise advice of physicians and sanitary engineers was ignored; those of railway engineers prevailed. The chance was lost. To-day this shortsightedness has placed a heavy burden on the shoulders of the doctors, and hampers their work at every turn".

No doubt, it is a knowledge of this sort of thing that prompted the following resolution, proposed by Sir Malcolm Watson, M.D., at a recent congress held in Calcutta. —"The Malaria Section of the 7th Congress of the Far Eastern Association of Tropical Medicine are aware of many instances of a great increase in the incidence of malaria caused by the facilities given to mosquito reproduction by engineering works, either during construction or afterwards, due to the altered conditions brought about. This Congress is of opinion that plans for railways canals, harbours and all similar engineering works likely to affect the conditions producing malaria should be submitted to the proper Public Health Authorities, and their Sanitary Engineers before being sanctioned by Governments."

It is satisfactory to be able to say that there are signs of a change of heart in this connection. The Colonial Office in London is proving sympathetic and medical experts of the necessary kinds are being sent into Africa. We may expect improvement, though it must, perforce, be slow. The whole story points the moral, that sanitary engineers, and indeed all engineers, should have a training in hygiene and the problems of communicable disease, as well as a certain grounding in biology, physiology, and preventive medicine, sufficient at least to enable them to work wholeheartedly and efficiently with the medical profession, so

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that the waste places of the world may be made metaphorically, as well as literally, to blossom as the rose. The world is a very small place now; intercommunication is rapid, and brings many races of mankind together. The problems of sanitary hygiene are becoming more complicated and more insistent. What is other people's concern to-day may be ours to-morrow.

A. G. NICHOLLS

THE AUTOMATIC REGULATION OF BODILY FUNCTIONS

IT is not generally realized of what paramount importance is the automatic regulation of the various functions of the body, how accurate and exact this is, and how complicated is the mechanism for its control. If this were kept better in mind there would be less disappointment with the results of various therapeutic measures.

The most familiar example is the automatic regulation of the temperature of the body. If this varies more than one degree we feel acutely uncomfortable, so it is so accurately regulated that the temperature of the surrounding air may vary 100°, or we may engage in violent exertion causing the production of very large amounts of heat, and yet, automatically ,the temperature of the body is maintained at 98 2/5°. In febrile illness this level is altered and may be raised four or five degrees, probably as part of a protective mechanism. The therapeutic enthusiast frantically endeavours to restore the level to normal by antipyretic drugs, ice-caps, cold packs, etc., measures as ineffective in health when opposed to the powerful machinery for the control of bodily heat as endeavouring to lower the level of the ocean with a tin dipper; under pathological conditions he may succeed in lowering the temperature for a short period, but how futile is the sum total of his accomplishment. Similar statements might be made regarding the rate of the respiration, of the heart-beat and many other bodily functions. The blood-pressure is automatically maintained at an optimum level for the condition of the various organs and the maintenance of the various bodily activities. If this level is thought to be unduly high, at times efforts are made to reduce it by hydrotherapy, drugs, diet, and other measures, which fortunately spend themselves futilely against the natural provisions for the blood-pressure control.

But, if one wishes to realize more fully the marvellous mechanism of the human body, one may turn to the almost infinite complexity of the chemical composition of the body. Take for example the sugar content of the blood. This is maintained automatically at an exact level, apparently by means of the secretion of the islands of Langerhans. If a man ingests a pound of sugar, the sugar content of his blood rises for a few minutes only and rapidly returns to normal. If no sugar is taken for days together, still the blood-sugar level remains constant. If through disablement of the regulating machinery by disease the blood-sugar is increased, the patient perishes of acidosis and coma; if it is decreased, he perishes equally with hypoglycæmia and convulsions. Yet so marvellous is the automatic control that normally neither of these dangers can occur. If now the islands of Langerhans cease to function, the therapeutist hopefully endeavours to regulate artifically the level of the blood-sugar by the injection of insulin, an impure extract of the glands of a different species of animal. Wonderful to relate, he may partially and temporarily succeed by controlling the intake of carbohydrates and by frequently testing the blood to see what the level really is. But how clumsy and inefficient are his efforts compared with the natural automatic control.

Through the secretion of the thyroid gland the basal metabolism is kept constant, and growth, nutrition and other functions are controlled. If the thyroid fails it may be partially compensated for by administering thyroxin or some thyroid extract. But normally the secretion of the thyroid varies from day to day according to the bodily

needs, and if anyone thinks he can imitate this automatic control, let him try to convert a cretin into a normal child and note how he succeeds. True, he can effect great improvement, but how far from the perfectly efficient accomplishment of nature.

Similar instances might be multiplied, as to the calcium balance, the chloride balance, the blood volume, the alkalinity of the body fluids, the iron content of the blood, and hundreds of others. True, we can temporarily and partially restore these, if markedly or dangerously altered, but how different this restoration is from the natural automatic control.

The endocrine system seems to find its greatest function in regulating these manifold balances, and the consideration of the miraculous manner in which these glands automatically function is called to the attention of those over-optimistic persons who think they can assist nature by throwing in extracts of these glands at irregular intervals, with no exact knowledge of their normal action.

H. B. CUSHING

RHEUMATIC DISEASES

RHEUMATIC fever, gout, and rheumatoid arthritis have for years attracted the attention of the clinician and pathologist, but many of the problems inherent in the subject are still far from solution. Perhaps the earliest, and certainly one of the most determined, attacks on the etiology of chronic rheumatism, was that of Strangeways and his associates in Cambridge some twenty years ago. Their researches were a splendid example of the advantages of teamwork, but certainly did not finally settle the matters in dispute. When one considers the inveterate nature of rheumatic diseases, using that term in the widest sense, the tendency to progress or relapse, the dangerous complications and sequelæ, and the disability that so often results, it is hard to overestimate their importance. We are glad to see, therefore, that two important conferences are to be held in May, one in the United States and one in England, which will deal with this subject.

At the forty-third annual meeting of the Association of American Physicians, which takes place on May 1, 2, and 3, at Washington, one morning is to be devoted to a symposium on rheumatic fever and gout, in which the etiology, clinical features, and treatment of these diseases are to be discussed.

On May 10th and 11th, a similar conference on the same group of diseases will take place in Bath, under the presidency of Sir George Newman, Chief Medical Officer of the Ministry of Health. Three sessions are to be held: one dealing with the Social Aspects, one with the Etiology, and one with Treatment. The Right Hon. Lord Dawson of Penn, Sir Humphry Rolleston, Bt., and Sir E. Farquhar Buzzard, will act as chairmen respectively at these sessions. The discussion will cover the following subjects:—acute and sub-acute rheumatic fever, chronic multiple arthritis, fibrositis, and degenerative arthritis. Eminent foreign medical men, from France, Belgium, Holland, Sweden, and the United States will also take part. It is devoutly to be hoped that these conferences, which will, no doubt, be largely of the nature of "stock-taking," will result in some tangible increase in our knowledge.

As noticed elsewhere in the *Journal*, the British Red Cross has also taken up the matter of providing treatment for rheumatic people, who are poor or in only moderate circumstances. The first of these clinics is to be established in London, and the sum of £18,000 has already been subscribed for this laudable purpose.

It may surprise many to learn that heart disease is the most frequent cause of death, according to reliable insurance statistics. Cancer and tuberculosis however at the present occupy the limelight, and the activities of the many societies which concern themselves with these diseases, and the publicity accorded them by the press, have brought into prominence their undisputed importance, while the death toll due to the

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rheumatic diseases has in consequence not received enough attention. The records of the Metropolitan Life Insurance Company, recently received, show that in 1927 more death claims were paid in connection with organic heart disease than for other conditions. Heart disease came first; external causes, such as accidents, suicides, and homicides were second; tuberculosis came third; and cancer was fourth in importance.

It is true that the expectation of life is much longer now than it ever was, at least in historic times, and this improvement is due to the more scientific handling of the infectious diseases, particularly small-pox, tuberculosis, syphilis, pneumonia, and typhoid fever. Cancer, however, is not in this category, and is undoubtedly on the increase. Rheumatism, if not indeed becoming more prevalent, is certainly not declining in incidence. While some forms of heart disease, notably the myocardial degenerations, are attributable to various forms of nephritis, to coronary degeneration, and wear and tear, yet medical men are agreed that the most important single cause of chronic myocarditis and of valvular heart disease is rheumatic fever (including its shadow, chorea), and that these affections are prëeminently affections of childhood and early life. The timely detection of chorea in school children; the elimination of foci of infection, in teeth and tonsils; the greater control of the infections, such as scarlatina and measles; and a more effective handling of the rheumatic attack itself, would do much to lessen the incidence of heart affections, and would materially assist in prolonging the span of life. Undoubtedly more attention should be given to rheumatic disease in its various forms. It is to be hoped that the conferences referred to will herald a great revival of interest in what is one of the great scourges of mankind.

A. G. NICHOLLS

THOUGHTS ON THE TREATMENT OF DISEASE

THE treatment of disease has ever held the most important place in the thoughts of our profession, although to not a few in every age the study of man himself, and of life, disease, and death, has been a source of great additional interest. So long as the cause of disease remained unknown, and the special action of drugs and other remedial agents remained chiefly a matter of imagination, faith and superstition played a chief part in therapy, and the *vis medicatrix naturæ* remained unrecognized.

Indeed, on looking back through the past centuries, it is a matter of surprise to note how fancy and superstition persistently supplanted the study of facts, and how little physicians knew of the true causes and even of the course of disease, while at the same time knowledge of the action on the system of the many drugs administered in the attempts to cure was extremely slight and imperfect. Prescriptions in even comparatively recent times contained a long list of these drugs, each added in the hope that some one might perhaps succeed in doing good, oblivious of the possibility that it might do great harm.

The picture that *Punch* drew in the early decades of the last century reveals a cynic's opinion of medicine in those days. An enfeebled patient is shown vainly struggling with the ogre of disease while a physician blindfolded and armed with a club strikes wildly, hitting now the patient and now the disease.

Skoda, a Viennese physician, was the first to denounce this blind therapy, and demonstrate in the wards of the Krankenhaus Nature's healing powers. He dispensed with the use of all drugs, allowed his patients fresh air and a simple therapy, and by this means greatly lowered mortality in almost all forms of disease.

It took physicians a long time to appreciate the lesson Skoda thus taught them. Even at the present day, many do not realize

the harm that may be done by the use of drugs whose toxic action has not been carefully studied. Many new synthetic drugs have been introduced to the profession in recent years and many patented drugs have been thrust into their notice by persistent advertising. In a large majority of these their toxic action has been very imperfectly studied.

Unfortunately, therapeutics at the present day receives scant attention in the modern text book and from teachers in many of our hospitals. All will admit that a correct diagnosis is of the greatest importance. The physician must know what he has to contend with, and although Nature may in many cases work wonders, the physician to-day with our present knowledge can often do much to assist her.

A contributor whose paper appears in our present issue strongly urges the use of the metric system in prescription writing. Undoubtedly this is for many reasons most desirable, and we strongly urge its adoption and use by the teaching staff in every hospital. His strong plea however, for the use of the single dose places the burden of multiplication on the dispensing clerk in the drug store. To many minds multiplication is undoubtedly vexatious, and to such the plan may prove a useful one. Many, however, will prefer to do their own multiplication which in the decimal system should never present much difficulty.

The prescription itself should never be regarded as of little importance. Care and thought should be given to the drug employed, and to the dosage in which it is ordered. We would join with our contributor in protest against the use of any patented preparations in prescriptions; sometimes such form the whole of the prescription. Latin however, permits of abbreviations being made better than does English. Moreover the Latin name of a drug more definitely specifies the drug to be employed than does any English word. Notwithstanding these criticisms we commend the article to the attention of our readers.

THE VALUE OF WINDOW-GLASS SUBSTITUTES

WE have referred in a previous issue[1] to a report by the Council of Physical Therapy of the American Medical Association on the efficiency of certain window-glass substitutes in transmitting the ultra-violet rays of sunlight. According to this report, such substances as vita-glass, corning-glass, cel-o-glass and flexo-glass, transmitted a large percentage of these rays, but later investigations[2] show more exactly what proportion pass through, and, in addition, how much the glasses themselves are affected by the passage of the rays.

The following table gives the percentage of ultra-violet solar rays transmitted by the glasses named: (it is understood, of course, that ordinary window glass does not transmit these particular rays of the solar spectrum to any appreciable extent.)

	Per cent
Fused quartz	92
Corex	92
Helioglass (vioray)	50
Vita-glass	50
Cel-o-glass	20
Quartz-lite	5
Flexo-glass	1

These results were obtained on exposure of new specimens to clear sunlight at the noon hour, from April until December.

Another and more reliable method, however, for testing the relative transparency of these substances to ultra-violet rays, is by the use of an artificial source of light, such as the quartz-mercury-arc, which produces a spectrum richer in ultra-violet rays than that of ordinary sunlight. By this means the various wave-lengths of the transmitted rays can be measured: in this case, the wave-length of 302mμ was taken as of convenient value for testing, and as representing ultra-violet rays at a high

(1) *Canad. M. Ass. J.*, August, 1927, xvii, 8.
(2) Letter Circular 235, (Third Revision), Dept. of Commerce, Bureau of Standards; Washington, Jan. 14, 1928.

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point of intensity. The results of the tests by this method were as follows:—

Trade Name	*Number of Samples Tested*	*Average Thickness*	*Average Percentage Transmission, at 302 mμ*
Fused quartz	1	4.7 mm.	92
Corex	4	2.8	89
Helioglass	15	2.3	56
Vita-glass	15	2.5	44
Cel-o-glass	5	0.1 (about)	30
Quartz-lite	16	1.9	0.5
Common window glass	14	3.3	0.0

These tables clearly show the respective capacities of the various glasses for transmitting the ultra-violet rays. These tests were all carried out on new specimens, but it is important to realize that continued exposure causes in some of the materials a progressive loss of power to transmit these rays; a condition known as "solarization." This deterioration is more rapidly caused by exposure to the quartz-mercury-arc than to sunlight.

In the case of vita-glass, which has been on the market for the longest time, it has been shown that the transmission after one year's use (in a hospital window) is only 25 per cent, compared with 50 per cent when new. Tests of other samples showed a similar loss of efficiency. It was also found that the deterioration took place chiefly in the first few weeks of exposure However, after the loss of about 22 to 25 per cent of its transmitting power, deterioration apparently ceases, and the smaller proportion of rays continue to pass through.

Helio-glass has not been tested over so long a period as has vita-glass, but, so far as investigation has gone, it undergoes a similar degree of deterioration. Cel-o-glass seems to lose but little of its transmission power in sunlight, if it is protected against varying conditions of weather, but exposure without this precaution reduces it to a state in which it will only transmit from 5 to 10 per cent of the ultra-violet rays.

The two glasses which appear so far to suffer no deterioration on exposure to sunlight are corex glass and quartz-lite. But exposure of the former to the quartz-mercury lamp causes a very marked deterioration, whilst the latter seems to lose very little of its power when so exposed.

These tests show, therefore, that not only do these various substances differ very widely in their capacity to transmit the ultra-violet rays of the sun or quartz-mercury-arc, but this quality is subject to varying degrees of deterioration; facts which should be borne in mind by those who wish to install these special glasses.

H. E. MACDERMOT

Editorial Comments

ROYAL COLLEGE OF SURGEONS—ENGLAND

Attention is drawn to the announcement under "Association Notes" on page 608 that the Royal College of Surgeons, England, has consented to conduct in Canada Primary Examinations leading to the Fellowship in that honoured body.

Negotiations between the Royal College and this Association have been proceeding since 1925 and it is a matter of much congratulation to the Canadian profession, and especially to the younger members, that such a happy culmination can be recorded.

THE CENTENARY OF THE "GLASGOW MEDICAL JOURNAL"

The centenary of the first publication of the *Glasgow Medical Journal* has been made the occasion of a special number on which we heartily congratulate its editorial staff. The survival of a medical journal for a hundred years is a cause for just pride, especially when as in this case, a high standard of journalism has been attained and sustained.

The *Glasgow Medical Journal* in its early years had its full share of difficulties, not the least of which arose from the rather frequent changes in its editorial management. It is not quite clear who was responsible for the start of the *Journal*, as its first number contains no hint of the steps which were taken to bring it out. It would seem not improbable however, that it was largely a private venture of the first editor Dr. William Mackenzie. In any case, the start was a good one. It was one of the succeeding editors, however, Dr. Andrew Buchanan, whose zeal for his journal overran his judgment. He attacked not only his critics but also those who showed no interest in the venture, calling them "the

dwellers in this Boeotian region so fatal to letters" and then continued:

"The time not occupied in the active discharge of professional duties is too often wasted in idleness and dissipation. Now we have supplied the inducement which was a-wanting. We have held out to the practitioners in this city and around it, an object of honourable ambition in the cultivation of medicine and the kindred sciences: and we have furnished the public with a more certain standard by which to estimate the qualifications of medical men than the solemnity of their aspect, the gravity of their demeanour, their insinuating address, or their convivial endowments."

This was not the way to win support, but with time and more discreet editing, the *Journal* began to make its force felt. More than once it had to withstand the vicious attacks of another journal the *Glasgow Medical Examiner*, which came to life at irregular intervals.

In addition to the interesting history of the *Journal* itself, this centenary number contains articles on medical journals and journalism by the late editor of the *British Medical Journal*, Sir Dawson Williams, and the editor of *The Lancet*, Sir Squire Sprigge. Several other papers of historical interest complete a number which is entirely worthy of the occasion which it celebrates.

H. E. MACDERMOT

MOSQUITO CONTROL IN THE OTTAWA DISTRICT

An experiment that will be watched with interest in the future is the work of the Mosquito Control Committee of the Ottawa District, which was organized on April 1, 1927, with Dr. R. E. Wodehouse as Chairman and Mr. Arthur Gibson as Secretary. As probably all of us are aware, there are certain months in spring and summer when the Canadian woods are practically uninhabitable, owing to the abundance of mosquitoes, black flies, and other insects. Even in some towns and villages, situated near the breeding-places of the mosquito, there are enough of these pests to detract considerably from the joy of living, though, fortunately, we do not have to incriminate them on the score of spreading infectious disease.

With a comparatively small amount of money, much too small to cope with a task of such magnitude, the committee has done fine work, in surveying various suspected districts, and in oiling pools where mosquito larvæ were abundant. It is important to note that immature larvæ were detected in snow-water pools as early as the middle of April. Twenty species of mosquitoes were identified by the Entomological Section of the Department of Agriculture, of which sixteen attack man. These belong chiefly to the genus Aedes, but Culex, Theobaldia, and Corethra were also noted. It is a little disquieting to learn that one of the malaria-carriers—Anopheles maculipennis—was also found.

It is probably too early to appraise results, but, from reports received, the committee felt encouraged and hope to continue their efforts this season. The work is well worth doing and we trust that the committee will obtain all the moral and financial support that they require to carry out their plans in an adequate way.

A. G. NICHOLLS

Incidence of Rheumatism, Chorea and Heart Disease in Tonsillectomized Children.—Albert D. Kaiser, Rochester, N.Y., reports on the results of a survey of 48,000 school children, in 20,000 of whom the tonsils had been removed, and in 28,000 of whom they had not been removed. The history pertaining to rheumatic fever, chorea, scarlet fever and heart disease has been obtained, and 1,200 children showing signs of rheumatic fever, chorea or heart disease have been examined. Most of the 20,000 children had had their tonsils removed five or more years previously. Rheumatic fever, joint pains or growing pains occurred in both groups; 8 per cent of the tonsillectomized group and 10 per cent of the nontonsillectomized group had rheumatic manifestations. Many of the former had had rheumatic symptoms before tonsillectomy. The tonsillectomized child not yet infected has a decidedly better chance to escape rheumatic infection over the same period of time than the child whose tonsils have not been removed. Recurrent attacks of rheumatic fever were less common in the group in which operation had been performed. Chorea occurred only slightly less often, 0.4 per cent as compared to 0.5 per cent, in the tonsillectomized group. The incidence of carditis following chorea was decidedly less in the tonsillectomized children. Scarlet fever occurred in 7.6 per cent of the tonsillectomized children, and in 16 per cent of the nontonsillectomized group. The children whose tonsils had been removed who developed scarlet fever developed considerably less valvular heart disease than those with scarlet fever in the control group. Rheumatic heart disease was found in 450 of the 20,000 tonsillectomized children and in 817 of the 28,000 who were not operated on. Based on a control study of 20,000 tonsillectomized children, it must be concluded that the tonsil is a factor in the causation of rheumatism, scarlet fever and chronic heart disease. The tonsillectomized child is assured greater protection against these infections than his companion whose tonsils have not been removed.—*J. Am. M. Ass.*, Dec. 31, 1927.

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Special Articles

THE DEVELOPMENT OF OUR KNOWLEDGE CONCERNING TUBERCULOSIS*

EIGHTH OSLER LECTURE OF THE VANCOUVER MEDICAL ASSOCIATION

BY C. H. VROOMAN, M.D., C.M.

Vancouver

PART I

First, I must thank you for the honour you have done me in asking me to deliver the eighth Osler lecture. The honour carries with it a considerable responsibility, which is made still greater by the high standard set by my predecessors in this office. This lecture, however, is rather an incident in a celebration, for we are gathered to-night not merely to hear a lecture but to celebrate the life and work of that greatest of Canadian physicians, Sir William Osler. In paying our small tribute to his memory, we do but honour ourselves in honouring one who by his life, his teaching and his practice, has done so much to keep high the ideals of our profession. He says of himself—

> "I have loved no darkness,
> Sophisticated no truth,
> Nursed no delusions,
> Allowed no fear."

It would be hard to choose for a discussion any subject in medicine that could not be illuminated by something which Osler had written. From the beginning of his medical teaching Osler was greatly interested in the subject of tuberculosis. He made fifty original contributions on different aspects of this subject. He was one of the moving spirits in organizing the National Tuberculosis Association in 1904, and became its first vice-president. One of the last addresses he gave before his death was on acute pneumonic tuberculosis—March 24, 1919.

The subject I have chosen for discussion is the development of our knowledge of tuberculosis, hoping that by a brief journey into the history of medicine we may better appreciate the laborious work by which the kernels of truth have been winnowed from the chaff of speculation.

> "The heights by great men reached and kept,
> Were not attained by sudden flight;
> But they while their companions slept
> Were toiling upward in the night."

Each method of diagnosis; each correct observation; each new experimental method; each new tool added to our armamentarium, has meant laborious work. The pioneers in these fields were great; some were geniuses, but they were not omniscient; they made mistakes, they stumbled in their search for truth, yet each added some truth to the store of knowledge, and we are debtors to them to-day.

> "I hold strongly with the statement," says Osler, "that it is a sign of a dry age when the great men of the past are held in light esteem. . . . . By the historical method alone can many problems in medicine be approached profitably. For example, the student who dates his knowledge of tuberculosis from Koch may have a very correct, but a very incomplete, appreciation of the subject."

By the ancients any chronic wasting disease, accompanied by cough and expectoration, was called consumption or phthisis. The description of this disease by Hippocrates, and his aphorisms concerning it, represented for more than two thousand years the sum of medical knowledge about a disease that probably during this period was responsible for every fifth or sixth death. That for two thousand years physicians should subscribe to the authority of Hippocrates and Galen redounds to the credit of these ancients, but it hardly increases our respect for those who would be so submissive to tradition.

About the end of the second century A.D., a high-born Roman lady who had spat blood consulted Galen.

> "I did not bleed her," writes the great physician, "as she had fasted for four days on account of the catarrh, but I ordered an active enema. I had her legs and arms rubbed and tied and her head shaved and covered with pigeon's dung. I then ordered the bath, desiring her to be well clothed after it, and to take some austere wine with fruit and some drinks; and a mild opiate before she slept. It appeared that her lungs still wanted cleansing, but I suffered her to remain at rest through the day, only employing frictions and giving an opiate at night. The next day she took some boiled honey and cream of ptisan and the frictions were repeated. This system was repeated with proper alterations for some days and the patient recovered without the use of milk."

Galen recommended his consumptives to live at Stabiae, a hill three miles from the Bay of Naples, and advised that they drink much cow's milk, or, better, goat's or asses' milk, or, best of all, woman's milk.

Aretaeus, a contemporary of Galen's was insistent on the virtues of a sea voyage and much milk.

> "And if the patient have it at his command," says Artaeus, "living on the sea will be beneficial, for the sea water contributes something desiccant to the

* Delivered before the Vancouver Medical Association, March 6, 1928.

ulcers . . . . Often milk alone sufficeth in place of all food, for milk is pleasant to take, is easy to drink, gives solid nourishment, and is more familiar than any other food to one from a child. In colour it is pleasant to see; as a medicine it seems to lubricate the windpipe; to clean as if with a feather the bronchi, and bring off phlegm, improve the breathing, and facilitate the discharges downward. If one then will drink plenty of this he will not stand in need of anything else. For it is a good thing that in a disease milk should prove both food and medicine . . . . Eggs from the fire, in liquid state but hot; they are best when newly laid.''

The nineteenth century was well spent before there was much improvement in the treatment of consumptives from that recommended by Galen and Aretaeus. Much, we will see, was learned in the meantime as to the pathology, diagnosis, clinical course, causation and prevention, before our modern methods of treatment became established. If one were to judge by some of the effusions regarding the treatment of disease that appear in the daily press, a large part of the population are still dwelling in the Galenic age. As illustrative of the state of knowledge that prevailed well into modern times let me read you Oliver Wendell Holmes' description of the visits of Master Giles Firmin, physician to the good people of Ipswich, New England, who, accompanied by his one pupil, answering to the scriptural name of Luke, is making his calls. It is the year 1647.

''They jog along the bridle-path on their horses until they come to another lowly dwelling. They sit a while with a delicate looking girl in whom the ingenuous youth naturally takes a special interest. The good physician talks cheerfully with her, asks her a few questions. Then to her mother: 'Goodwife, Margaret hath somewhat profited, as she telleth, by the goat's milk she hath taken night and morning. Do thou pluck a maniple—that is an handful—of the plant called Maidenhair, and make a syrup therewith as I have shewed thee. Let her take a cup full of the same, fasting before she sleepeth, also before she riseth from her bed.' And so they leave the house.

'' 'What thinkest thou, Luke, of the maid we have been visiting?' 'She seemeth not much ailing, Master, according to my poor judgment. For she did say she she was better. And she had a red cheek and a bright eye, and she spake of being soon able to walk unto the meeting, and did seem greatly hopeful, but spare of flesh, methought, and her voice something hoarse, as of one that hath a defluxion, with some small coughing from a cold, as she did say. Speak I not truly, Master, that she will be well speedily?'

'' 'Yea, Luke, I do think she shall be well, and mayhap speedily. But it is not here with us she shall be well. For that redness of the cheek is but the sign of the fever which, after the Grecians, we do call the hectical; and that shining of the eyes is but a sickly glazing, and they which do every day get better and likewise thinner and weaker shall find that way leadeth to the church-yard gate. This is the malady which the ancients did call 'tabes,' or the wasting disease, and some do name the consumption. A disease whereof most that fall ailing do perish. This Margaret is not long for earth—but she knoweth it not, and still hopeth.'

'' 'Why, then, Master, didst thou give her of thy medicine, seeing that her ail is unto death?'

'' 'Thou shalt learn, boy, that they which are sick must have somewhat wherewith to busy their thoughts. There be some who do give these tabid or consumptives a certain posset made with lime-water and anise and liquorice and raisins of the sun, and there be other some who do give the juice of crawfishes boiled in barley-water with chicken-broth, but these be toys, as I do think, and ye shall find as good virtue, nay better, in this syrup of the simple called Maidenhair'.''

But even while Giles Firmin was jogging his rounds great things were stirring in the world. New discoveries were being made, and beginnings of new methods acquired, that would in time revolutionize the whole world of medicine. In the 16th century Vesalius broke away from the old Galenic authority and became the maker of modern anatomy. In 1628 William Harvey published his famous lectures announcing the circulation of the blood. Towards the latter part of the 17th century, a Jesuit priest, who is described as a mathematician, a physicist, an optician, an Orientalist, a virtuoso and physician, Athanasius Kircher (1598-1680), of Fulda, made a crude lens and started to look at things. He looked at the blood of plague patients and saw myriads of what he called ''worms,'' which he thought were the cause of plague. We know now that what he saw were the red blood cells. But it was the beginning of a new method, the study of the ''infinitely little,'' which was to mean much for mankind. Then in Delft in the Netherlands, in the latter part of the 17th and beginning of the 18th centuries, there lived a man who spent most of his life of ninety-one years making microscopes and looking at the wonderful little things of the world. A queer character was old Anthony Van Leeuwenhoek (1632-1723). He earned his living sweeping out the city hall, and spent all his spare time grinding glass into lenses, making microscopes and looking at all varieties of things—hairs, flies, lice, bugs, rain-water, scrapings from his tongue and teeth. He wrote papers and sent them to the Royal Society of London, and caused great commotion. They sent two of their learned men to Delft to see if he were telling the truth. Old Leeuwenhoek let the city hall go dirty while he showed them the wiggly little things to be seen in stagnant water, the garlands and chains of living things he could obtain by scraping his tongue and teeth. He told them that the wiggly things disappeared from his mouth after he had drunk several cups of hot coffee, which he used to do in order to clear his head from the effects of too liberal potations of spirits. They tried to buy one of his precious microscopes, but he would not sell; they were the work of his hands and beyond price. Leeuwenhoek made 247 microscopes with 419 lenses; he contributed 375 papers to the London Royal Society and 27 to the

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French Academy of Science—no mean contribution to the progress of the world from a humble janitor, the establishment of a new method which finally culminated in the epoch-making discoveries of Pasteur, Lister and Koch.

Would time permit, it would be interesting and profitable to dwell on the work done by many of the pioneers of early research. Mention must be made of a few, who added to our knowledge and are now almost forgotten:—Sylvius (1614-1672) who first pointed out the connection between tubercles and phthisis; Richard Morton (1635-1698), who wrote voluminously, and described thirty different varieties of consumption; William Stark (1740-1770), a brilliant and almost forgotten young Englishman, who gave one of the most perfect descriptions of the gross pathology of tuberculosis. Stark announced that all phthisis was due to tubercles, thus anticipating by forty-eight years Laennec's important pronouncement. He did only ten post mortems on tuberculous subjects, and died at the age of thirty.

There is one investigator of the 18th century to whom we must give more than a passing notice, because his discovery gave us a new method which has added much to our knowledge of diseases of the chest. This is Leopold Auenbrugger (1722-1809). He lived and practised medicine in Vienna, and in 1761, at the age of thirty-nine, he published in Latin a small volume on "Percussion of the Chest." It was really an epoch-making book, and it is worth our while to read the first paragraph of his preface. He says:

"I here present the reader with a new sign which I have discovered for detecting diseases of the chest This consists in the percussion of the human thorax, whereby, according to the character of the particular sounds thence elicited, an opinion is formed of the internal state of that cavity. In making public my discoveries respecting this matter I have been actuated neither by an itch for writing nor a fondness for speculation, but by the desire of submitting to my brethren the fruits of seven years' observation and reflexion. In doing so, I have not been unconscious of the dangers I must encounter: since it has always been the fate of those who have illustrated or improved the arts and sciences by their discoveries to be beset by envy, malice, detraction, and calumny. This, the common lot, I have chosen to undergo; but with the determination of refusing to every one who is actuated by such motives as these all explanation of my doctrines. What I have written I have proved again and again, by the testimony of my own senses, and amid laborious and tedious exertions; still guarding on all occasions against the seductive influence of self-love."

Little notice was taken of Auenbrugger's modest work of ninety-five pages, and it was almost forgotten, until the great French physician Corvisart in 1808 translated and brought it again to the attention of the medical world, where it was at last accepted as describing a method of great usefulness. Auenbrugger lived only one year after Corvisart's translation was published.

Among the pupils of the great Corvisart was one who combined the patient industry of the investigator with the vision of a genius, and who was destined to carry the torch of truth far beyond any of his fellows. As the founder of modern clinical medicine, Theophile Laennec can easily be classed as among the great of our art. Born in 1781; raised by his uncle at Nantes, we are told that he and his brother had to go to school by the back streets in order to avoid the dreadful sights of the guillotine, which was erected in front of their house. At fourteen, he was dissecting in the medical school; at nineteen, he went to Paris; in the following three years he wrote careful histories of four hundred cases; in 1804 at the age of twenty-three he graduated. He started practice in Paris. In his first year of private practice we are told he earned 150 francs; in his second year 400 francs, but by 1813 it had reached 10,000 francs, and he had become a well-known physician in Paris. He edited a medical journal and contributed extensively to medical literature. His contributions on morbid anatomy made him one of the recognized authorities in France, long before he ever thought of the stethoscope. So it was no immature or unknown physician who was appointed to the staff of the Necker Hospital in 1816; it was a careful and observant clinician, who had learned that the only way to find truth in medicine was to work for it. The discovery of the stethoscope was such a notable event in medicine that it is well for us to hear in Laennec's own words the account of it. He says, in the introduction to his treatise on "The Diseases of the Chest and on Mediate Auscultation," published in 1818:

"In 1816 I was consulted by a young woman labouring under general symptoms of diseased heart, and in whose case percussion and the application of the hand were of little avail on account of the great degree of fatness. The other method just mentioned being rendered inadmissible by the age and sex of the patient, I happened to recollect a simple and well-known fact in acoustics, and fancied it might be turned to some use on the present occasion. The fact I allude to is the great distinctness with which we hear the scratch of a pin at one end of a piece of wood on applying our ear to the other. Immediately, on this suggestion, I rolled a quire of paper into a kind of cylinder and applied one end of it to the region of the heart and the other to my ear, and was not a little surprised and pleased to find that I could thereby perceive the action of the heart in a manner much more clear and distinct than I had ever been able to do by the immediate application of the ear. From this moment I imagined that the circumstance might furnish means for enabling us to ascertain the character, not only of the action of the heart, but of every species of sound produced by the motion of all the thoracic viscera, and consequently for the exploration of the respiration, the voice, the rhonchus, and perhaps even the fluctuation of fluid extravasated

in the pleura or the pericardium. With this conviction I forthwith commenced at the Hospital Necker a series of observations from which I have been able to deduce a set of new signs of diseases of the chest, for the most part certain, simple, and prominent, and calculated, perhaps, to render the diagnoses of the diseases of the lungs, heart, and pleura as decided and circumstantial as the indications furnished to the surgeon by the introduction of the finger or sound, in the complaints wherein these are used."

Think of it—in 1816—Laennec discovers a new tool. In 1818 he published the results of his observations, and these observations have proved to be at least 90 per cent correct. A new diagnostic method was introduced by which our store of knowledge has been enormously increased, and the observations found substantially correct after one hundred years.

Laennec did more than observe the signs of diseases of the chest. He spent hours and days in studying the morbid anatomy, especially tuberculosis, and announced definitely the unity of all forms of tuberculosis. Phthisis was caused by successive crops of tubercles. Caseation was always preceded by tubercles. It was sixty years later before this unity of all forms of tuberculosis was finally established by Villemin. This truth was vigorously combated by the great Virchow, who held that certain forms of pneumonia only became tuberculous because of some hereditary predisposition of the tissues or some unknown deteriorating influence. It was Virchow's pupil Neimeyer who was the author of the saying "the worst thing that could happen a consumptive was to become tuberculous."

On August 2, 1826, in his forty-fifth year, ten years after he invented the stethoscope, Laennec died of pulmonary tuberculosis. Sir Wm. Osler says, "Laennec's contribution to the study of disease of the lungs, of the heart, and of the abdominal organs really laid the foundation of modern clinical medicine."

Laennec not only put into our hands the means to recognize pulmonary tuberculosis clinically in its earlier stages, but he described the disease as a clinical entity and gave us for all time a new means of diagnosis. As to the cause, and as to the treatment, Laennec and his contemporaries were still fumbling in the dark. The idea that a consumptive became such because of the curse of God or the influence of the evil eye had pretty generally been abandoned. Physicians now said it was due to heredity factors or was a miasma brought on by damp east winds, or it was a degeneration of the tissues from unknown cause. Some even hinted it might be infectious, but this was considered a wild speculation. A rather close parallel may be seen in our present day theories in regard to the cause of cancer.

As to treatment: blood letting, tartar emetic, depletents, protection from the cold, especially the evil effects of night air, were all that could be thought of. They all died, or nearly all died, who showed definite symptoms. Louis tells us that the average length of life of a consumptive was two years.

Early in the 19th century scientific men were peering with renewed interest into the microscope, and re-discovering the little wiggly worms described by old Leeuwenhoek. It was thought by some that these minute things might be a cause of disease, but the controversy was still waging as to the spontaneous generation of life. It was the genius of Louis Pasteur that settled this matter for all time and started a new epoch in medicine. It would lead us too far afield at this time to even try to sketch the work of this wonderful French scientist. We all know how Pasteur's work opened the way for Lister and all the triumphs of antiseptic surgery. Scores of others, less remembered, started investigating the many unsolved problems of medicine. It was inevitable that tuberculosis as the "Captain of the Men of Death" should be attacked as one of the major problems.

The honour of proving that tuberculosis was an infectious disease goes to another Frenchman. Jean-Antoine Villemin December 5, 1865, presented a paper to the French Academy of Medicine in Paris in which he said that he had inoculated material from the gray tubercles of a consumptive's lungs into rabbits; that several weeks later he had killed the rabbits and examined them and in their internal organs had found tubercles exactly like those met with in consumption. Therefore, tuberculosis was an infectious disease due to a specific virus—a most amazing statement which was received by that distinguished body of physicians who composed the French Academy of Medicine with absolute incredulity. Villemin stood alone, and was subjected to the most acrimonious criticism. Here is the peroration to an address of Pidoux criticising him:—

"What a misfortune should things result thus: social economy, public and private hygiene, prophylaxis, medicine—all their aspirations condemned in advance! The poor consumptives sequestered like the bearers of plague! Family tenderness at war with fear, and self preservation, face to face with a malady which because of its long course and homicidal atmosphere would wear out devotion! If consumption is contagious we dare not say it aloud."

But Villemin was not depressed by these criticisms and three years later published a masterly book on tuberculosis, reiterating his former opinion, backed by more complete experiments, that consumption was an infectious disease. The new method of experiment, animal inoculation brought out the new truth. Villemin did not crown his work by discovering the virus or infectious agent, but he established the truth as

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far as he could with his method. He re-established the doctrine of Laennec as to the unity of all tuberculous lesions, which the authority of Virchow had successfully until then combated. The crowning achievement of the discovery of the tubercle bacillus was left to another man, who established another method in the study of disease.

In 1843, in a small village in the Harz Mountains, was born Robert Koch. Father Koch was not over blessed with this world's goods and Robert was the eldest of a family of nine, so it was no spoon-fed youth who won his way to fame. His early dreams were to sail the seven seas, to explore the world, and to do this he wanted to become a doctor, and then a ship's surgeon. So, after much scraping and scrimping, he managed to enter the medical course at the University of Göttingen. The professor of anatomy at Göttingen was Jacob Henle, a man who did much more than give his name to certain tubules in the kidney. Henle was a great personality. He not only taught his pupils to peer through a microscope, but he taught them to think. He it was who wrote, many years before Koch became his pupil, this maxim: "Before microscopic forms can be regarded as the cause of contagion in man they must be found constantly in the contagious material, they must be isolated from it, and their strength tested." It is no doubt due to teaching such as this that Koch became afterwards the accurate investigator.

Koch graduated in 1866, and he did not become a ship's surgeon. He became a country practitioner and got married, thereby giving "hostages to fortune." He did not make a success at first of country practice and we find him moving several times, and at one time seriously thinking of emigrating to America; finally we find him in 1872 settled at Wollstein in Posen, and practice had grown to such an extent that he had a little more than enough to buy the bare necessities of life. Frau Koch celebrated the growing prosperity by presenting her husband with a microscope for a birthday present, not a wise thing for her own happiness but a fateful thing for the happiness of the world. We find that Robert for the rest of his life devoted more time to the microscope than to his family. He curtained off a part of his consulting room, built a laboratory, got an incubator, a microtome, some rabbits and guinea pigs and for four years he worked. He neglected his practice, his meals, his wife. It is true he tried to tell her what he was doing, but Frau Koch was practical, and her reply was, "But, Robert, you smell so."

In April, 1876, Professor Cohn of Breslau received a letter from his old-time pupil Robert Koch, stating that he had worked out the life history of the germ of the disease called anthrax. Koch went to Breslau at Cohn's invitation, and for three days before Cohn and his assistants he demonstrated. He first showed the anthrax bacillus in the blood of animals. He planted the blood on sterile blood serum (it had taken many months to find out this simple method of growing germs). He recovered the anthrax bacillus from the culture, injected it into animals, and produced the disease, thus fulfilling for the first time the dictum laid down years before by his teacher, Jacob Henle. Imagine the excitement in the laboratory. We find Professor Cohnheim exclaiming to his assistants: "The greatest discovery in bacteriology ever made has just been demonstrated and this is not the last time that this young Robert Koch will surprise and shame us by the brilliance of his investigations."

Back Koch went to Wollstein for another two years and did patient work on various infections. It was not until 1880 that a vacancy occurring in the Imperial Health Bureau in Berlin, Koch was offered the position and moved to Berlin where he remained for the rest of his life. His activity at this time was enormous, and it would take too long to recount the steps by which he developed the various methods of growing germs, isolating pure cultures, and studying their life history. It was only a natural evolution that when in 1881 and 1882 he devoted his attention to tuberculosis he should at last isolate the tubercle bacillus which had so long evaded the grasp of so many other careful investigators.

On March 24, 1882, before the Berlin Medical Society Koch read his paper announcing that he had discovered the bacillus causing tuberculosis. It is probably one of the most complete and flawless scientific demonstrations ever made of a new discovery. There was no loop-hole. The chain of evidence was complete and no investigator has found a flaw in it since. The tubercle bacillus causes all forms of tuberculosis. We are told that there was no discussion following this paper. The great Virchow was there, the veteran of many a scientific battle, but even Virchow could find nothing to criticize. The demonstration was complete; they filed out in silence.

In the Adirondacks, by the shores of Saranac Lake, there was living at this time a physician, who, nine years before, had been told he had tuberculosis of the upper two-thirds of his left lung. He had gone there to die, but life in the fresh air, combined with rest, had restored him to comparative health. Dr. Edward Livingstone Trudeau, inspired by the writings of Brehmer and Deitweiler, was gathering money from his wealthy friends to build a sanatorium where poor as well as rich could have the treatment he had found so beneficial. To him came the

news of Koch's discovery. He says in his autobiography:—

"This time in medicine was the dawn of the achievements of the new experimental method. . . . If I could learn to grow the tubercle bacillus, and if I could produce tuberculosis at will with it in guinea pigs, the next step would be to find something that would kill the germ in the living animal. If an inoculated guinea pig could be cured, then in all probability this great burden of sickness could be lifted from the human race."

Trudeau learned to grow and isolate the tubercle bacillus, but, alas! he did not discover, nor has any one yet discovered how to kill the tubercle bacillus without destroying the animal affected. Unfortunately, what Trudeau said to his students forty years ago still remains true—"The tubercle bacillus bore cheerfully a degree of medication which proved fatal to its host."

THE EXAMINATION OF THE SPINAL FLUID IN DIAGNOSIS*

BY L. C. MONTGOMERY, M.D.

Montreal

As you are well aware, examination of the cerebrospinal fluid is of great value in making a diagnosis of disease involving the meninges covering the brain and spinal cord. It is my purpose this evening to review the technique with which the several examinations are made, and interpret the results obtained.

LUMBAR PUNCTURE

The puncture may be made with the patient lying on his side or in a sitting position with the back bent well forward.

1. *Lying on Side.*—The back should be well exposed to the light, and flexed as much as possible. This can best be accomplished by having an assistant, on the opposite side of the patient, seize the latter's head and legs at the knees and pull them towards each other. The level at which the puncture should be done is between the fourth and fifth lumbar vertebræ. This is the site of the widest interlaminal space. It can be estimated easily by drawing a line across the patient's back at the level of the highest margin of the iliac crests. The line intersects the vertebral column at the tip of the fourth lumbar spine. The puncture is made immediately below this spine.

2. *Sitting Position.*—The patient should be sitting on the edge of a single bed or on a low stool, stooping well forward, with his knees separated, arms hanging loose, and hands resting on something solid below the level of his knees.

The needle used should be one either of platinum or steel, and at least 8 cm., or just over 3 inches, long. This length enables one to reach the arachnoidal sac, and is yet short enough to stop short in the sac without penetrating to the dura on the far side.

Having placed the patient in the proper position, the skin should be sterilized about the area and then rendered anæsthetic by the use of a 2 per cent solution of novocaine, using an ordinary hypodermic syringe with a needle that is at least 1¼ inches long. Having obtained local anæsthesia, place the left index finger on the fourth lumbar spine as a guide, and with the right hand push in the large needle, about half an inch below and half an inch to the right of this spot, (in order to avoid the dense interspinous ligament), directing the point of the needle horizontally forward and a little inwards. The ligamentum subflavum, deep in between the laminæ, is somewhat resistant, and the needle is felt to be checked here. But one should push firmly on, if no bone is struck, and suddenly the needle penetrates the ligament and dura-arachnoid and enters the arachnoidal sac. If the needle strikes a lamina instead of the ligament, withdraw it a little and try a point above or below.

MEASUREMENT OF THE SPINAL FLUID PRESSURE

As soon as one is sure he is in the arachnoidal sac the needle should be connected with the spinal manometer. This consists of a glass tube containing a column of mercury. Leading from the column is rubber tubing, with connecting plugs by which the tubing may be attached to the butt of the lumbar puncture needle. By this means the pressure of the spinal fluid may be transmitted to the column of mercury, and the effect on the height of the mercury noted.

With the patient lying on his side, the normal pressure of the cerebrospinal fluid is from 8 to 10 c.c. of Hg. In the sitting position the pressure is much higher. Coughing causes a slight elevation of from 2 to 4 c.c. Normally, respiration does not alter the manometer reading, but if the intrathecal pressure is increased to 30 c.c. or upward slight respiratory waves may occur, the pressure falling during inspiration and rising during expiration.

Under ordinary circumstances, compression of the jugular veins for a few seconds by the fingers will increase the pressure of the cerebrospinal fluid temporarily, no matter at what level the puncture needle be situated, whether in the lumbar or suboccipital regions. If for any reason there is a block in the spinal subarachnoid, (due to tumour, caries, etc.), this increased pressure will not occur, and this fact may be of considerable aid in diagnosis.

THE VARIOUS TESTS FOR GLOBULIN

The three most commonly used are the Ross-Jones, Pandy, and Noguchi.

Ross-Jones Test.—Take a small test tube (Wassermann). Pour in ½ c.c. of saturated ammonium sulphate solution and superimpose

on it an equal amount of cerebrospinal fluid. The appearance of an opaque ring at the point of contact indicates an increase of globulin.

Pandy's Test.—Take a small test tube (Wassermann). Almost fill the tube with 5 per cent aqueous solution of carbolic acid (1-20). Then with a pipette add one drop of cerebrospinal fluid. If positive for globulin, a cigarette smoke cloud will appear following the drop as it descends through the carbolic acid solution, best seen by holding the tube up against a black background. This test is very sensitive and nearly all normal fluids will show a very faint cloud.

Noguchi's Test.—Measure into a small test tube (Wassermann) with a pipette 0.2 c.c. of cerebrospinal fluid and add 0.5 c.c. of butyric acid solution (5 c.c. of butyric acid in 45 c.c. of physiological salt solution) and boil for a few seconds. Add 0.1 c.c. of 4 per cent aqueous solution of sodium hydroxide. Boil again for a few seconds. If the spinal fluid contains an increased amount of globulin a definite precipitate will appear in from five to twenty minutes. This is the most accurate of the globulin tests.

THE CELL COUNT OF THE CEREBROSPINAL FLUID

The fluid is obtained in the usual manner and the cells should be counted as soon as possible, as they tend to settle to the bottom of the containing tube. A simple way is to use the ordinary pipette for counting white blood cells and the ordinary counting chamber. In making an estimation nine square millimetres are counted and the number obtained is divided by nine to obtain the average for one square millimetre. As the space under the slide is 1/10 mm. thick the result obtained is multiplied by ten.

Example: the total count of nine different sq. mm. = 9 . ˙. average number of cells in 1 sq. mm. = 9 ÷ 9 = 1. Number in 1 cm. = 1 x 10 = 10.

If it is desired to use a staining solution in order to show the cells more easily Unna's polychrome methylene blue may be employed. In this case, use is again made of the white blood cell pipette. The stain solution is first sucked up to the "0.5" mark, and then to the "11" mark fresh cerebrospinal fluid is sucked up. The pipette should then be well shaken and allowed to stand a few minutes to allow of the stain acting on the cells. Then it is to be shaken again immediately before counting. A correction of 5 per cent may be made for this slight dilution.

NUMBER OF CELLS PER C.MM. IN NORMAL SPINAL FLUID AND THE TYPE OF CELL

The average number of cells in the normal spinal fluid lies between 4 and 6 per 1 c.mm. Above 6 is suspicious, while above 10 indicates a pathological condition. The cells in normal fluid are small mononuclear leucocytes, similar to those of the blood, together with, very rarely, a few large mononuclears.

THE PATHOLOGICAL ALTERATIONS IN THE CEREBROSPINAL FLUID IN VARIOUS DISEASES

In *encephalitis lethargica* the spinal fluid is clear, colourless, and not under increased pressure. There is usually a positive test for globulin, especially in the early stages of the disease, if it has set in with fever. The cells are usually increased to between 50 and 100 per cubic millimeter and are mononuclear in type, that is, they are lymphocytes. The sugar content is practically always increased and a positive Fehling's or Benedict's reaction is obtained. This, as will be mentioned later, is an important aid in diagnosis. The normal amount of sugar is from 0.04 to 0.06 per cent. If anyone is interested in the colloidal gold curves, encephalitis shows a curve most often resembling lues of the central nervous system.

Infantile Paralysis.—In acute anterior poliomyelitis the fluid varies slightly, according to the stage of the disease. There is at first a definite increase in the volume and the pressure. The fluid may be colourless or slightly hazy. The increase in the number of cells may vary from 15 to 2,000 per c.mm. At first, the great majority are polymorphonuclear cells, but in a few hours are almost entirely mononuclears. The globulin reactions are usually positive. Fehling's solution is reduced as readily as by normal spinal fluid, which helps to distinguish it from tuberculous meningitis.

In *Epidemic or Cerebrospinal Meningitis* there is a definite increase in pressure, usually between 20 and 30 c.c. of water. The fluid, in a well marked case, is definitely turbid. The globulin tests are positive. The cells may be as high as several thousands per c.mm. and are nearly all polymorphonuclear in type, until towards the later stages, when they become mononuclear. The sugar content is diminished. On centrifuging some of the field, and making a smear of the deposit and staining by Gram's method, one will usually find small intra-cellular and extra-cellular, gram-negative biscuit-shaped diplococci. These are, of course, the meningococci, the organisms responsible for the disease.

Pneumococcic Meningitis. — This may occur independently of, or as a complication of, pneumococcic infection elsewhere in the body, such as the lungs or peritoneum. In twenty years at the Johns Hopkins Hospital there were twenty-five cases of pneumococcic meningitis, in eighteen of which pneumonia was present. Here also there is a definite increase in pressure, and the fluid is turbid. The cells are polymorphonuclear in type. On centrifuging and staining with Gram's method, gram-positive lancet-shaped diplococci are found. The sugar-content is diminished.

In *Tuberculous Meningitis* the fluid is early under greatly increased pressure, which slowly decreases as coma sets in. Although it is quite clear and normal in appearance, the globulin tests are positive; the cells are increased in number, usually to the extent of about 100 per c.mm., and at least 90 per cent of them are small mononuclears (lymphocytes). The fluid does not reduce Fehling's solution, and this is an important aid in the differential diagnosis of this disease from encephalitis lethargica. On standing for twenty-four hours a feathery clot of fibrin is formed down the centre of the fluid, and, it is in this central fibrin that the acid-fast bacilli are most frequently found.

In *Syphilis of the Central Nervous System* there is an increase in the amount of fluid and a moderate increase in the pressure. The globulin tests are positive. The cells are increased, mononuclear in type; there is a positive Wassermann reaction and a fairly typical colloidal gold curve. In general paresis, the examination of the fluid is most important, and reveals: a lymphocytosis of moderate grade; positive globulin reactions; a typical colloidal gold curve; and, in 90 per cent of the cases, a positive Wassermann reaction.

THE TECHNIQUE OF STAINING CEREBROSPINAL FLUID FOR ACID-FAST BACILLI

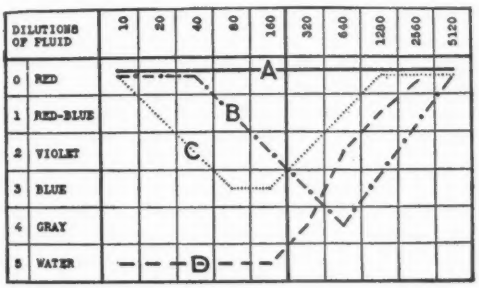
As mentioned above, in the spinal fluid withdrawn from a case of tuberculous meningitis a pellicle or fibrinous clot will form in the centre of the fluid, if allowed to stand for at least twelve to twenty-four hours.

With a platinum loop, the fibrin from the fluid should be carefully withdrawn and guided gently on to a carefully cleansed glass slide. Patience is required, and the fibrinous film is apt to be very adherent to the loop. With care it can be teased out and crushed on the glass slide, and a smear made in the usual way. Once thoroughly dry, it can be stained by the usual Carbol-Fuchsin method. The smear must be searched, however, very slowly and carefully, because, as a rule, the organisms are few and far between.

THE COLLOIDAL GOLD REACTION

This test is of great value in the recognition of early general paresis. Its underlying principle consists in the fact that colloidal solutions, whether organic or inorganic, are protected against precipitation, in the presence of a small amount of albumen, by means of electrolytes. When the amount of albumen is increased, precipitation occurs, but if the albumen increases beyond a certain point protection against precipitation again sets in.

Roughly, the technique consists in making up a solution of colloidal gold which gives a red colour. To a series of ten or twelve test tubes containing 1 c.c. of progressive dilutions of cerebrospinal fluid, 5 c.c. of gold solution are added. Normal cerebrospinal fluid gives a negative reaction, *i.e.*, in all the tubes the red colour remains unchanged, even after standing twenty-four hours. If inflammatory changes are present, however, the albuminoid substances precipitate the gold, changing the colour from the original red to a bluish red, violet, dark blue, pale blue, white or colourless. In each examination the colours in the ten tubes are represented by numbers, as shown in the accompanying diagram. The numeral 5 indicates complete precipitation, lower numbers designate the various colours found with partial precipitation. The results are read from left to right, beginning with the 1/10 dilution. One would expect the decolourization to be proportional to the concentration of the cerebrospinal fluid, and to diminish steadily according to the dilution. This is not so however. Each pathological fluid has its curve of precipitation (gold curve).



Colloidal gold curves

These reactions may be expressed graphically as curves, as are pointed out in the diagram.

A is the curve of normal fluid, which reads	00000,00000
B is the non-luetic curve, which reads	00012,34210
C is the luetic curve, which reads	01233,31000
D is the paretic curve, which reads	55555,42100

The part of the chart represented by dilutions 1:10 to 1:160 is called the luetic zone; and that from 1:160 to 1:1280, the non-luetic or meningeal zone. The paretic curve is the most constant of all.

This test may be positive when the spinal fluid and blood Wassermann are negative, the cell count within normal limits, and the test for globulin negative.

Reports of Societies

MEETING OF THE OUT-PATIENT STAFF, TORONTO GENERAL HOSPITAL

Lipoma of the Transverse Colon Producing Obstruction; Remarkable Venous Murmur Over the Lower End of the Sternum; Night Periosteal Pains in the Shins

A meeting of the Out-Patient Staff took place at the Toronto General Hospital on February 15th.

Dr. McFarland gave the history and presented the specimen from a case of lipoma of the large intestine. There had been a particularly interesting history, he said, in connection with the case, a young woman of about thirty years; for many months the patient had complained of vague abdominal pain associated with the passage of mucus and at times of blood. She did not appear, however, to be losing much weight or strength. A series of x-ray examinations had shown nothing, but symptoms of obstruction had begun to develop, and it had seemed advisable to perform a laparotomy even while the patient was in the middle of a second x-ray examination. On opening the abdomen, an obstruction was evident in the middle of the transverse colon, and at this point a tumour mass could be felt projecting into the lumen of the intestine. Incision showed a soft globular tumour, about the size of a pigeon's egg, which was partially obstructing the duct. The tumour was removed by resecting a short section of the bowel. The patient made a good recovery.

In response to questions as to the frequency of this sort of tumour, Dr. McFarland remarked that they were not common, though met with from time to time in any surgical service. Adenoma was the most usual type and these, he said, might occur by the thousands in any one case. This condition of multiple adenoma is spoken of as *polyposis intestinalis adenomatosis*, and the tumours are more numerous in the colon and rectum. The lipomas rank next in frequency. These might be at times very large, produce obstruction, or if smaller induce intussusception; they again are more frequent in the large intestine. Myomas are the least commonly met with of the benign tumours.

Dr. Young presented a case with a remarkable venous murmur heard over the lower sternum: a case which showed also a much enlarged spleen and a faint systolic murmur about and below the spleen. The murmur over the lower sternum and the adjoining areas was of the type spoken of as a venous hum, loud, roaring, and continuous, with a slight intensification during the heart systole and during inspiration. On first listening to this remarkable murmur, Dr. Young said he had been inclined to think that he was dealing with a case of septal defect, because in such cases a continuous murmur situated in the right corner of the heart is a not uncommon finding; however, further investigation had shown some interesting and more positive points. First, there could be felt an oval depression in the sternum just above the junction of the xiphoid with the manubrium; secondly, slight pressure on the bone immediately below this point stopped the murmur in such a dramatic fashion that one could only conclude that the loud humming sound was produced by some vessel emptying through this opening into some larger underlying blood sinus. The probability was, he said, that the accident of the sternal defect with the enlargement of some superficial vein was responsible for the development of the condition present. The patient had no complaint of a cardio-vascular nature, but seemed, however, to be failing somewhat in strength and there was the additional finding of the large spleen with regular rounded edges. Nothing had been found in the blood or in the general examination to account for this splenic enlargement, nor could one say whence came the systolic murmur heard in the splenic area and thereabouts. Whether the enlarged spleen and the increased venous flow, as one heard it at the septal defect, could be looked upon as conditions associated with an early liver-cirrhosis was difficult to say. The loudness of the venous hum, and the dramatic way in which it could be stopped by pressure, were certainly striking details of this most unusual case.

In the discussion which took place it was generally admitted that murmurs due to defects of the ventricular septum are apt to have a curious quality, but the question was asked whether such cardiac murmurs are ever quite so loud or continuous. It was pointed out further that occasionally loud venous hums are produced in the vena cava as it goes through the opening of the diaphragm, and that firm pressure will materially influence murmurs of this sort. One of the observers noted that a very similar case had been reported by Dr. J. N. Henry in the *American Journal of Medical Sciences* in 1911; in this case Dr. Henry describes a very evident but small defect in the sternum, through which a vein passed from the

surface of the chest, over which the same type of loud roaring murmur could be heard, and in which slight pressure of a finger immediately above the opening stopped the murmur at once. The autopsy in this particular case revealed the fact that the patient had cirrhosis of the liver with the usually associated over-development of the veins, and that the vein passing through the sternum emptied into a large venous sinus immediately beneath the bone the murmur apparently developing in connection with the veins of the falciform ligament. One could not state positively that these two cases represented the same state of affairs, but certainly in some directions they bore close resemblance to each other.

Dr. Gwyn presented a patient who had been complaining most bitterly for weeks of pains in the lower third of his shins. Dr. Gwyn said he was induced to show this case as an example of what was often overlooked, namely, that there were very few of the war-time conditions which had not their prototype in civil practice. To all intents and purposes this man might pass as a case of trench shins. He had been treated for various conditions, such as flat foot and arthritis, but it was quite apparent that his history did not conform to the conditions so diagnosed. The pain was nocturnal, was acute and boring, and seemed to disappear as he got up. It was present to a lesser degree if he lay down during the day, and was bad enough to incapacitate him. The detail of most importance in his history was that he had had gonorrhœa eighteen months ago, and that there still remained a thickened and tender epididymis. Little or nothing had been revealed by x-ray of the bones, but this was quite in keeping with the findings as detailed in the war cases, and it was probable that there was nothing in the inflamed periosteum which would show in a picture. Dr. Gwyn stated that there were probably more of such cases to be found if sought for, and that one should not overlook the fact that conditions other than syphilis may produce these curious so-called "osteoscopic pains." The trench shin of the War had supposedly some direct association with lice infestation, but there were other cases in which chronic pyogenic infection had seemed capable of producing this chronic, persisting shin pain. Why it should be worse at night, or on lying down, it was hard to say; possibly the arterial blood supply would not be as free in the recumbent position, and possibly the activities of the periosteum might be influenced by posture. As to treatment, it was suggested that various forms of heat should be applied, and that a vaccine should be used: prostatic massage should also be employed with a view to clearing out the seminal vesicles.

N. B. GWYN

MONTREAL MEDICO-CHIRURGICAL SOCIETY

Malignant Degeneration in Intestinal Polypi; Tuberculous Pericarditis; Arrested Gangrene in a Diabetic Patient; Prophylactic Immunization by Calmette's Serum.

At the regular half monthly meeting of the society, with the President, Dr. H. B. Cushing in the chair, Dr. T. R. Waugh presented surgical specimens from a case of *polyposis intestinorum* (adenomata), showing malignant degeneration.

Dr. C. F. Moffatt read the report of a case of tuberculous pericarditis in a patient aged 53, who gave the history of an attack of pleurisy eighteen years previously. The onset of the attack simulated typhoid fever. The pericardial effusion became massive, producing urgent symptoms which were relieved by paracentesis of the pericardium. The case at present shows secondary adhesions.

Dr. W. F. Hamilton called attention to the fact that it was extremely rare, even at autopsy, to find indications of pericarditis in tuberculous patients, and while pericarditis is certainly an uncommon condition in Dr. Hamilton's experience, pericarditis occurred more frequently in connection with tuberculous pleurisy than from any other cause.

Dr. E. H. Mason presented a case of diabetes mellitus with arteriosclerosis and gangrene of the foot, with extensive infection and destruction of tissue, but in which progressive healing was taking place under medical treatment alone.

Dr. F. A. C. Scrimger, in discussing the case, said that up to within a very short time ago it was generally thought that gangrene, especially diabetic gangrene, demanded immediate amputation. During the last few years, however, since we had obtained better control of diabetes, amputation was shown to be unnecessary in a very considerable proportion of cases. Although in its present condition the foot might never be of much service to the patient, the important point was that the extensive gangrene had been healed. Surgeons now felt that almost any surgical interference that was regarded as necessary could be undertaken, with almost as great hope of success as in the ordinary normal patient. This great advance is due not only to the control of the course of the disease now possessed by the physician, but also to the encouragement of the circulation by mechanical and voluntary movement.

The paper of the evening was read by *Dr. S. A. Petroff* of Saranac Lake, on the "Prophylactic immunization in children by the Bacillus Calmette-Guérin." In introducing the speaker, Dr. Cushing stated that Professor Calmette, a man of international reputation for the past

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twenty-five years, and a recognized authority on questions of vaccination and research, had introduced this method of immunization in children after years of investigation. His method since its introduction had aroused a great deal of discussion in all parts of the world. It was therefore with pleasure that they were expecting to hear that evening a critical discussion of the method by a recognized authority on the subject. An abstract of the paper appears in this issue on page 581.

In the discussion which followed the reading of the paper, *Dr. Meakins* said that Professor Petroff had demonstrated clearly that there was no value in this method at the present time. Professor Calmette, however, had given us a chance to watch a wonderful human experiment, nearly 100,000 babies inoculated with the living organism. He thought it was Theobald Smith who made the statement that he was convinced that any future protection against tuberculosis, if such were possible through inoculation, would have to be done with living, attenuated organisms. It was all very well to criticize and say that Calmette's organism was not effective. Still there was nothing any better, and we might not know the complete story for another thirty years. According to reports up to the present time, the harmful effects of the Calmette vaccination were slight as compared with the effects of tuberculosis in the human race. Even if his method might not do any good, we had no concrete evidence that it does any harm. We had not yet made any definite advance in immunization that was valuable with dead organisms. All our advances in immunology have been through the use of living organisms. In his opinion we must not be too dogmatic in throwing aside this great experiment which had been made in the last ten years.

Dr. Beaudry spoke of what had been attempted in Montreal with this method. In the beginning of 1926 they were fortunate to obtain from the Pasteur Institute some of Calmette's vaccine, and they had used it in many cases. They had however never used it unless they had a signed permit from the attending physician and from the parents. The vaccine was administered through the mouth to 17 new-born babies in 1926, and in 1927 to 321 more. They had at the present 8 babies who had actually received the vaccine. Their records showed no harmful results. During the past year they had watched as many of these as they could. Out of 234 on the list on January 1st of this year, 172 were in good health; 39 were outside of their district. In the house to house vaccination made by their nurses 14 babies were found to be sick, but according to the information given none of these illnesses had anything to do with the vaccine. In the reports of the cases which had died, and in which an autopsy was obtained, there was no tuberculosis. In the further analysis it was found that 15 had been in close contact with active tuberculosis in the home. Out of these 15 cases 13 were in good health; one had died from capillary bronchitis according to the report from the attending physician; the other one was sick and had developed an infection in the cervical glands. Pus was taken from the glands and inoculated into a guinea pig, and we are at present awaiting results.

Dr. Watson, of Ottawa, stated that he was most interested in this method from the point of view of both human and animal immunology. After listening to Dr. Petroff's analysis of Calmette's immunization, he felt that it was doubtful whether we yet grasped the nature of the immunity conferred by this method. Professor Calmette, since the first introduction of this method, had made many modifications in it. His first announcement was that cattle could be successfully protected against tuberculosis if vaccinated within the first fifteen days after birth without changing any environment. He had now modified his view to the extent of insisting on the isolation of the calves for at least one month after birth, raising them on pure milk and protecting them from the danger of infection.

What was the immunity conferred so far as it was known to-day? Certainly, it was not immunity in the generally accepted sense of the word. It did not cure tuberculosis; it did not prevent the vaccinated animal from becoming infected; it did not destroy the virulent bacilli; and it did not prevent the inoculated animal from eliminating virulent bacilli. What it claimed to do was to diminish the virulence of the bacillus, and to prevent the development of active progressive tuberculosis in the vaccinated animal. Professor Calmette frankly admitted that if a vaccinated animal was exposed to a virulent infection during the first year of life it was possible that tuberculosis of a mild character might develop. Not enough time had elapsed to say whether this was true or not. Professor Calmette had drawn an analogy between B.C.G. and anthrax and all those other inoculations that were effective in very acute diseases, but in those other forms of vaccination an acute infection was produced in which the vaccinated animal either died quickly or recovered speedily, and did not carry the bacilli any length of time. On the other hand, tuberculosis was a slow and insidious infection, and all tuberculosis workers were agreed that arrested tuberculosis might and frequently did become active. There were other inconsistencies in the explanation of Professor Calmette as to his method of vaccination. He insisted that the vaccination must be made within the first few days after birth before infection could possibly take place. Yet the whole premises on which he placed the

efficiency of vaccination was on the natural phenomenon of resistance to infection.

Professor Petroff, in closing, stated that the first immunity was undoubtedly most important. The first three months were very critical, for children at that time were most readily infected; although he believed that Calmette's organism was not virulent in the majority of cases, he believed its use was dangerous, because we did not yet know the action of the organisms nor in what period any of these children might develop an infection. He concluded, "I assure you that I would not give this vaccine to any child of mine after what I have seen."

Association Notes

Preliminary Programme

FIFTY-NINTH ANNUAL MEETING OF THE CANADIAN MEDICAL ASSOCIATION

CHARLOTTETOWN, JUNE 18, 19, 20, 21, 22, 1928

Monday, June 18th

9.00 a.m.—Registration at Prince of Wales College.

10.30 a.m.—Meeting of Council. Prince of Wales College.

12.30 p.m.—Council Luncheon at Victoria Hotel. Guests of the President-Elect, Dr. S. R. Jenkins.
Installation of the President.

1.30 p.m.—Luncheon at Beach Grove Inn, and drive about the City and Suburb—for ladies.

2.30 p.m.—Meeting of Council.

7.00 p.m.—Dinner at Beach Grove Inn. The Council to be guests of the Charlottetown Medical Society.

8.30 p.m.—Reception and Musicale at Prince of Wales College.

Tuesday, June 19th

10.00 a.m.—Meeting of Council. Prince of Wales College.

11.00 a.m.—Drive to Cavendish, where luncheon will be served.

12.00 a.m.—Annual meeting of the Canadian Medical Protective Association.

12.30 p.m.—Luncheon.

2.30 p.m.—Meeting of Council.

4.30 p.m.—Tea at Golf Links, guests of Charlottetown Golf Club.

7.00 p.m.—Dinner. The Council the guests of the Prince Edward Island Medical Association at the Victoria Hotel.

8.30 p.m.—Bridge for the ladies at the Navy League.

Wednesday, June 20th

Scientific Session. Prince of Wales College.

9.00 a.m.—Coarctation of the aorta with obliteration of the descending arch diagnosed during life in a boy of 14; impending rupture of the aorta; cerebral death; with a statistical study of the causes of death in 200 cases with autopsy. (Lantern.)
Dr. Maude Abbott and Dr. W. F. Hamilton, Montreal.

The Treatment of Pernicious Anæmia.
Dr. Duncan Graham, Toronto.

The Post-operative Accident.
Dr. G. H. Murphy, Halifax.

Heart Disease and Pregnancy.
Dr. W. B. Hendry, Toronto.

Types of Encephalitis Lethargica in New Brunswick.
Dr. A. F. VanWart, Fredericton.

Carcinoma and Ulcer of the Stomach, with Demonstration of Wax Models.
Dr. E. M. Eberts, Montreal.

Pathological Changes in the Breast, and their Clinical Signs.
Sir Lenthal Cheatle, London, Eng.

Luncheon

4.00 p.m.—Garden Party at the residence of His Honour the Lieutenant-Governor of the Province of Prince Edward Island.

7.45 p.m.—Annual Dinner Dance at Beach Grove Inn.

Thursday, June 21st

9.00 a.m.—The Wasted Hand.
Dr. L. J. Austin, Kingston.
Asthma.
Dr. Daniel Nicholson, Winnipeg.

Primary Ulcerative Colitis.
Dr. P. H. T. Thorlakson, Winnipeg.

The Treatment of Chorea.
Dr. Haig Sims, Montreal.

Focal Infection as Encountered in Common Disabilities.
Dr. W. L. Robinson, Toronto.

Benign Papilloma of the Bladder.
Dr. R. E. Powell, Montreal.

Pleural Pains—their cause.
Dr. H. A. Bray, New York.

Maternal Mortality.
Dr. Helen MacMurchy, Ottawa;
Dr. W. B. Hendry, Toronto.

11.00 a.m.—For ladies. Drive about city and suburbs and visit to Fox Ranches.

Luncheon

2.00 p.m.—Tea at Dalvay, the summer residence of the Bishop of Charlottetown.

8.00 p.m.—Public Meeting, Prince of Wales College, at which the following addresses will be given:—

Sunlight—its effect on the growth and resistance of the child.
Dr. Alan Brown, Toronto.

The Value of Periodic Health Examinations.
Dr. A. Grant Fleming, Montreal.

Immigration.
The Honourable J. H. King, M.D., Minister of Health for Canada.

Friday, June 22nd

9.00 a.m.—The Use of Sulpho-cyanate of Soda in High Blood Pressure.
Dr. R. D. Rudolf, Toronto.
Dr. A. G. Smith, Toronto.

Cancer of the Cervix Uteri; the value of hysterectomy versus radiation in early cancer of the cervix.
Dr. John Fraser, Montreal.

Cancer of the Stomach.
Dr. F. N. G. Starr, Toronto.

Some Clinical Aspects of Hypothyroidism.
Dr. A. H. Gordon, Montreal.

Consideration and Treatment of Chronic Purulent Otitis Media.
Dr. Geo. Tobey, Boston.

Responsibilities and Opportunities of the General Practitioner in Preventive Medicine.
Dr. A. Grant Fleming, Montreal.

Some Common Mistakes in Diagnosis and Therapy in Diseases of Children.
Dr. Alan Brown, Toronto.

Luncheon

4.00 p.m.—Garden Party at the home of Dr. and Mrs. S. R. Jenkins, Charlottetown.

7.00 p.m.—Alumni Dinners and Class Reunions.

NOTES REGARDING THE MEETING

Headquarters.

The Prince of Wales College, in which will be housed the scientific sessions, registration, and scientific and commercial exhibits.

Registration.

The registration office will be found in the Exhibit Hall, Prince of Wales College. As admission to scientific sessions and entertainments will be by convention badge only, members are advised that they must register, as must also, the members of their party.

Messages.

It is suggested that members in attendance have all letters, telegrams and telephone calls directed to them in care of the Canadian Medical Association, Prince of Wales College, Charlottetown, P.E.I.

Programme.

It will be noted that there are to be no Sectional Meetings. All papers will be presented in General Sessions. The Programme Committee announces that the programme will start on time each morning, and will continue until completed before adjournment is made for luncheon. The afternoons are thus left free for entertainment.

The Annual Dinner Dance.

The Annual Dinner Dance will be held on Wednesday night at Beach Grove Inn.

CANADIAN MEDICAL PROTECTIVE ASSOCIATION

All members of the Canadian Medical Protective Association are asked to note that the annual meeting of that Association will be held in Prince of Wales College, Charlottetown, on Tuesday, June 19th, commencing at twelve o'clock noon. As important business will come up for consideration, it is hoped that there will be a large attendance at this meeting.

ENTERTAINMENTS

The Committee responsible for the entertainment of the members of the Canadian Medical Association who attend the next annual meeting has completed a programme that, it is felt, will be acceptable, and that will give a great deal of pleasure and recreation to the doctors and their wives.

The Charlottetown Golf Club has placed its facilities at the disposal of the Convention for the week. The golfers will play over one of the most picturesque courses in the Dominion. The turf is second to none.

The local committee has kept in mind the fact that many of our guests are visiting this part of Canada for the first time, and the programme has been so arranged that they may see as much of the Garden Province as possible. With this in view, it has been arranged to visit the beautiful north shore on two occasions. On Tuesday, June 19th, our guests will be taken on a twenty-mile drive through delightful pastoral scenery to Cavendish where luncheon will be served. This is one of the beauty spots of the Island that has been made well known by the writings of Lucy Maud Montgomery. The panorama of the coast line, with its many bays and capes and green fields ending in sand dunes, must be seen to be appreciated.

On Thursday, June 21st, a drive of fourteen miles will be taken to Dalvay This is also situated on the Gulf shore of the Island among the sand dunes that are so reminiscent of northern France. In this locality, quaint fishing villages, inhabited by Acadian French, are dotted over the landscape. Dalvay is a palatial summer residence, built some years ago by an American gentleman of considerable means, and is well worth a visit. It is at present owned by the Bishop of Charlottetown, who has kindly loaned it for the occasion.

In addition to these longer trips ample opportunity will be provided to have shorter drives about the city and adjacent country, when fox ranches will be inspected. Unfortunately, at this season of the year, the animals have lost their lustrous winter coats of such value, and are now shaggy and small.

Garden parties, dinners, dances and bridge parties have their place on the programme that has been arranged for your entertainment.

HOW TO REACH PRINCE EDWARD ISLAND BY MOTOR

The principal route to Prince Edward Island is by way of New Brunswick, from Sackville to Cape Tormentine, thence across the Strait of Northumberland by the well equipped steam car-ferry, one of the finest in the world. The distance across the Strait of Northumberland is nine miles, and the crossing takes forty-five minutes. For the ferry from Cape Tormentine autos must be at the pier at 9.50 a.m., 2.20 p.m., or 7.15 p.m. The charge for transfer is $4.00 per car.

The other every-day route is *via* Pictou, N.S., and direct steamer to Charlottetown, a distance of fifty miles, and the sailing time four hours. The steamer *Hochelaga* on this route is modern and well appointed. The *S.S. Hochelaga* leaves Pictou, N.S., for Charlottetown daily at 8.30 a.m. She has accommodation for sixteen autos, and the rate charged is $5.00, $6.00 or $7.00, according to size.

Canadian Medical Association representatives will be present on the arrival of the boat at Charlottetown, and of the car-ferry at Borden.

The roads from Borden to Charlottetown will be carefully marked for autoists.

Every visiting doctor, who has signified his intention to come to the Convention, will be furnished with full information regarding hotel accommodation for himself and party before departure.

It is the ardent wish of the Island doctors that all may have a safe and pleasant trip to the Land of Romance and Loveliness—The Garden of The Gulf.

HOW TO REACH PRINCE EDWARD ISLAND BY TRAIN

The following information regarding train service and fares, Montreal to Charlottetown, P.E.I., is submitted to the members of the Canadian Medical Association, in connection with the annual convention, June 18 to 23, 1928.

Train Service—(Standard Time).

Leave Montreal, "Maritime Express," 10.45 a.m., except Saturday.

Arrive Sackville, "Maritime Express," 11.58 a.m., except Sunday.

Leave Sackville, 1.10 p.m., except Sunday.

Arrive Charlottetown, 6.30 p.m., except Sunday.

The equipment of the "Maritime Express' is of the most modern type, all steel construction, and includes sleeping and dining car service. In the event of a sufficient number of delegates travelling from Montreal on any one date, we would be glad to operate a through sleeping-car without change, Montreal to Charlottetown *via* Sackville and Borden.

Fares: Montreal to Charlottetown and Return (tax included). Special party fare for ten or more people travelling together on the going journey, time limit ten days, $31.40; regular return fare, good for one month $35.90; summer tourist fare, good for stopover, and with time limit, October 31, 1928, $37.65.

Sleeping Car Fares (tax included).—Mont-

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real to Sackville, N. B., lower berth $4.80; upper berth $3.85; drawing room, $17.60.

Montreal to Charlottetown, P.E.I., lower berth $6.15; upper berth $4.95; drawing room $22.00.

For any further particulars or for reservation of sleeping car accommodation communicate with M. O. Dafoe, City Passenger Agent, C.N.R., 230 St. James St., Montreal.

ROYAL COLLEGE OF SURGEONS, ENGLAND

PRIMARY EXAMINATIONS IN CANADA IN 1929

We are authorized to announce that arrangements have been completed whereby the Royal College of Surgeons, England, will conduct in Canada the Primary Examinations leading to the F.R.C.S.

An abstract of the terms of agreement follows:—

I. The Canadian Medical Association is the "Appointed Authority" to represent the Royal College in Canada, and to be responsible for the arrangements to be made in Canada for the conduct of the examinations.

II. The Royal College will send from England, two (2) Examiners in Anatomy and two (2) Examiners in Physiology.

These Examiners shall be present or past members of the Board of Examiners in Anatomy and Physiology for the Fellowship.

III. A Professor of Anatomy and a Professor of Physiology (or such other persons as may be nominated) shall be appointed by the College, from names submitted by the Canadian Medical Association, to act as Assessors to the Examiners.

IV. The Examination, written and *viva voce*, of each candidate in each subject shall be conducted by two English Examiners and one Canadian Assessor.

V. The questions for the written paper in Canada shall be set by the Board of Examiners in Anatomy and Physiology for the Fellowship at the same time as those for the written paper for the June examination in England and shall be taken to Canada by the Examiners sent from England.

VI. The written paper examination will be held on the arrival of the Examiners in Canada, and the *viva voce* examination as soon after as convenient.

VII. The result of the examination will be determined and announced by the Examiners in Canada upon completion of the examination.

VIII. The fee payable by each candidate before admission to examination or re-examination shall be $100.00, such fees to be collected by the Canadian Medical Association.

IX. A candidate desirous of being examined must deliver to the Secretary of the Royal College of Surgeons, Lincoln's Inn Fields, London, W.C., not later than May 1st, 1929, the following certificates:—

1. Of matriculation at a recognized university;

2. Of having completed the examinations in Anatomy and Physiology for degrees in Medicine and Surgery of a recognized university;

3. Of having dissected in a recognized medical school or schools during six terms or eighteen months;

Note.—Dissections during the regular vacations will be accepted, provided the certificate shows that they have been performed under the superintendence of an authorized teacher in a recognized medical school.

4. Of having attended in a recognized medical school or schools:—

(a) A course of lectures on Anatomy during two terms;

(b) a course of lectures on Physiology during two terms;

(c) a course of Experimental Physiology;

Note.—It is meant that the learners themselves shall, individually, be engaged on the necessary experiments, manipulations, etc.; but it is not hereby intended that the learners shall perform vivisections.

(d) a course of Chemical Physiology;

(e) a course of Histology.

The first examination will be conducted at Toronto in July or August, 1929, provided the number of applicants warrants that such an examination shall be held.

Subsequent examinations will be held at the discretion of the two organizations concerned, but it is the present opinion that the interval shall be two or perhaps three years.

For further detailed information apply to the General Secretary, Canadian Medical Association, 184 College Street, Toronto 2, Canada.

A meeting of the Ontario Neuro-Psychiatric Association will be held at Westminster Hospital, London, Ontario, on Monday, June 11, 1928.

A view of Kingston from Lake Ontario

Provincial Association Notes

PRELIMINARY PROGRAMME OF THE FORTY-EIGHTH ANNUAL MEETING OF THE ONTARIO MEDICAL ASSOCIATION TO BE HELD IN KINGSTON, MAY 29th, 30th, 31st and JUNE 1st, 1928.

HEADQUARTERS

La Salle Hotel and City Buildings.

REGISTRATION

The registration office will be found in Ontario Hall at the City Buildings. As admission to scientific sessions and entertainments will be by convention badge only, members are advised that they must register, as must, also, the members of their party.

The scientific meetings are to be held in Memorial Hall, City Buildings.

MESSAGES

It is suggested that members in attendance have all letters, telegrams and telephone calls directed to them in care of the Ontario Medical Association, City Buildings, Kingston.

ACCOMMODATION

Members are urged to notify the Local Committee at once with reference to accommodation desired.

It is also important that, immediately upon your arrival, you and your party proceed to the convention headquarters at the City Buildings, and register. If you have made tentative advance registration, full particulars of the accommodation secured for you will be available.

PROGRAMME

It will be noted that there are to be no Section Meetings. All papers will be presented in General Sessions. The Programme Committee announces that the programme will start on time each morning, and will continue until completed, before adjournment is made for luncheon.

The afternoons are thus left free for entertainment.

THE ANNUAL DINNER DANCE

The Annual Dinner Dance will be held on Wednesday night in the La Salle Hotel. Following the address of the President, the members and their ladies will enjoy three hours of dancing. Tickets will be on sale at the Registration Bureau and should be obtained at time of Registration.

ALUMNI DINNERS

Thursday evening, May 31st, has been left open for Alumni Dinners and Class Reunions. The Local Committee will gladly co-operate with all groups desiring private accommodation, but, in order to do so, must know the number of dinners to be held. Officers of the various Alumni Associations are advised to communicate with Dr. W. A. Jones, Kingston, Secretary of the Local Committee, well in advance of the date of the meeting.

ENTERTAINMENT

The attention of members and their friends is called to the afternoon entertainments which are being provided. Believing that the social side of the meeting is quite as important as the scientific, the Local Committee has introduced an innovation this year in leaving the afternoons free for pleasure. A real good time is in store for all who desire to avail themselves of the hospitality which is offered.

PROGRAMME

Tuesday, May 29th

Place of meeting Memorial Hall, City Buildings.

10:00 a.m.—Meeting of the Board of Directors.

11:00 a.m.—Meeting of the Committee on General Purposes.

12:30 p.m.—Luncheon.

2:30 p.m.—Meeting of the Committee on General Purposes.

6:00 p.m.—Meeting of the Nominating Committee.

7:30 p.m.—Round Table Dinner and Conference (at La Salle Hotel); conducted by the Committee on Inter-Relations. All members of the Association are cordially invited to this function.

Wednesday, May 30th

Place of meeting Memorial Hall, City Buildings.

8:30 a.m.—Registration.

9:00 a.m.—Business Meeting of the Association.
Report of the Committee on General Purposes.
Report of the Nominating Committee.

9:30 a.m.—"Dermatitis Venenata," Dr. W. R. Jaffrey, Hamilton.
Discussion led by Dr. Omar Wilson, Ottawa.
"Coronary Thombosis," Dr. N. B. Gwyn, Toronto.
Discussion led by Dr. A. J. MacKenzie, Toronto.
"Procidentia Uteri," Dr. Geo. Hooper, Ottawa.
Discussion led by Dr. F. B. Mowbray, Hamilton.
"Symposium on Subacute and Chronic Forms of Nephritis"—
1. Etiology, pathology and clinical classification, Dr. W. L. Robinson, Toronto.
2. Symptomatology, course, clinical and laboratory findings, Dr. H. S. Hutchison, Toronto.
3. Diagnosis, prognosis and treatment, Dr. W. R. Campbell, Toronto.
Discussion opened by Dr. Duncan Graham, Toronto.
"Uterine Hæmorrhage, its causes and treatment," Dr. Thomas Cullen, Professor of Clinical Gynæcology, Johns Hopkins Medical School, Baltimore.

Luncheon

Afternoon.—Boat trip among the Thousand Islands—Golf—Motor Drives.

7:30 p.m.—Annual Dinner Dance, La Salle Hotel.
Address of the President, Dr. Weston Krupp, Woodstock.

Thursday, May 31st

Place of Meeting, Memorial Hall, City Buildings

8:45 a.m.—"The histamine test of gastric secretion, application in clinical and research work," Dr. H. V. Dobson, Peterborough.
Discussion led by Dr. W. Magner, Toronto.
"Arterial Hypertension," Dr. G. C. Hale, London.
Discussion led by Dr. H. C. Wales, Toronto.
"Intestinal obstruction and its treatment by enterostomy, etc," Dr. G. H. Stobie, Belleville.
Discussion led by Dr. Roscoe R. Graham, Toronto.
"Carbon Monoxide Poisoning," especially its late effects, Dr. J. C. S. Battley, London.
Discussion led by Dr. W. R. Campbell, Toronto.
"Pernicious Anæmia," Dr. S. M. Asselstine, Windsor.
Pernicious Anæmia and its Dietetic Treatment," Dr. E. E. Mills, Montreal.
Discussion led by Dr. J. H. Laidlaw, Ottawa.
"The Importance of Roentgen Rays in Diagnosis," Dr. T. L. Gray, St. Thomas.
Discussion led by Dr. W. A. Jones, Kingston.
"Some of the uses of the duodenal tube in diagnosis and treatment with special reference to gall tract disease," Dr. B. B. Vincent Lyon, Chief of Clinic Gastro-Intestinal Department, Jefferson Medical School, Philadelphia.
Discussion led by Dr. G. W. Mylks, Kingston.
Short Business Session of the Association.

Luncheon

2:00 p.m.—Capitol Theatre, showing of film produced by Dr. R. G. Canti, London, England—

"Growth of tumour cells in vitro and effects of radium thereon."

Military Tournament, Royal Military College.

7:30 p.m.—Alumni Dinners.

Friday, June 1st

Place of Meeting, Memorial Hall, City Buildings

8:45 a.m.—"Normal Obstetrics," Dr. W. P. Tew, London.

Discussion to be arranged.

"Surgical Shock," Dr. D. T. Smith, Ottawa.

Discussion led by Dr. F. Etherington, Kingston.

"Idiopathic Ulcerative Colitis," Dr. E. E. Cleaver, Toronto.

Discussion led by Dr. W. Magner, Toronto.

"Chronic Intestinal Indigestion," Dr. H. Little, London.

Discussion led by Dr. R. R. MacGregor, Kingston.

"Atypical Goitres," Dr. J. K. MacGregor, Hamilton.

"Investigation and Surgical Treatment of Goitres," Dr. S. K. Evans, Ottawa.

Discussion led by Dr. A. J. Grant, London.

"The practising physician and his relationship to Public Health Service," Dr. James Wallace, Associate Field Director, American Public Health Association.

"Our present conception of focal infection, a clinical and experimental study," Dr. J. G. Dwyer, New York City.

Short Business Session of the Association.

Luncheon

2:00 p.m.—Capitol Theatre, showing of film produced by Dr. R. G. Canti, London, England—"Growth of tumour cells in vitro and effects of radium thereon."

Garden Party, Rockwood Hospital.

REMINDERS

Excellent Golf Course—Bring your clubs.

Tennis players will be well taken care of.

The Frontenac Club and the Kingston Yacht Club will also extend privileges.

Lots of cars to show visitors about.

Kingston and surrounding country abound with historic interest.

Scientifically and socially this is going to be a splendid meeting.

PLAN TO BE PRESENT

Members of the Association and guests are warned not to bring their dogs to Kingston as the district is in strict quarantine on account of rabies.

Medical Legislation

The following is a copy of recent acts of the Alberta Legislation affecting the profession in Alberta which have been passed during the Winter Session of 1927-8.

AN ACT TO PROVIDE A BOARD TO DEAL WITH THE DISCIPLINE OF PROFESSIONS.

This Bill provides for the appointment of a Professional Discipline Board:

(a) with disciplinary powers over any profession or calling which has no disciplinary powers of its own.

(b) with disciplinary powers after reference to the governing body of any profession or calling which has disciplinary powers of its own.

The Bill permits of an appeal to the Board by any person who has been disciplined by his own profession or calling, for conduct which involves no moral turpitude.

In cases where the governing body of a profession or calling, does not duly investigate, or its disciplinary powers are inadequate, or exercises its disciplinary powers too leniently, the Board has the power of its own motion, to step in and punish the persons whose conduct is complained of.

The Board is given very complete powers as to the compelling of persons to give evidence before it, and to make rules as to its own procedure.

The Bill further provides that in questions of law and fact its decision shall be final.

The Bill does not operate with respect to any profession or calling until the Act governing it is placed in the schedule to the Bill by the Lieutenant-Governor in Council.

While the above is in general the idea of the Bill, the profession would doubtless appreciate further details, which are given herewith.

The Lieutenant-Governor in Council, is, as all will understand, the Provincial Cabinet; power is therefore given to the Cabinet to state when and what professions shall come under the Act. They may include all the learned professions or they may exclude some of them.

The Cabinet also appoints the members of the Board which will be charged with the carrying out of the provisions of the Act, and also it may dismiss them at pleasure.

Assurance has been given that it will not be a partisan Board, but one of men of high standing and repute, in which the professions and the public equally will have confidence.

This Board was to be wholly of laymen as first announced, but, on further consideration and after representation, a change was made in the principle and the Government announced the names of some of the members. and among them we find Judge Walsh, a judge of the Supreme Court; Dr. F. H. Mewburn, Professor of Surgery, and an outstanding member of the medical profession; Dr. Stewart, a leading dentist of the province and one who has sat in the Alberta Legislature for eight years; a Brigadier-General in the Canadian Army during the Great War; Mr. Evans, a prominent business man of Edmonton; and one other layman to be appointed from Calgary.

As originally presented, the Bill provided for the Board having the power to define what was professional conduct, but this clause was struck out by the Government.

Where the Appropriate Act of any profession has given no disciplinary powers to the governing body, the Board has the power to erase or fine to the extent of $1,000.00 a person found guilty of unprofessional conduct, or otherwise unfitted for the practice of his profession.

Where a governing body has dealt with an individual, and the said person feels that he was unfairly dealt with, he may appeal to the Board which will have power to decide whether such conduct does or does not involve moral turpitude, and whether it in fact constitutes unprofessional conduct or not, or is otherwise punishable under the provisions of the appropriate Act.

The Board in its discretion may accept and act upon evidence by affidavit or written affirmation or by the report made by any governing body or any other persons or person to whom the Board may delegate the duty of reporting to it, but no person shall be debarred by the Board from practising his profession on affidavit alone.

The person complained against is a compellable witness, and no person is excused from testifying or from producing any book, document, or paper in any investigation or inquiry before said Board, and further the Board shall not be bound by the technical rules of evidence. It is clearly stated however that any evidence a compellable witness may be obliged to give shall not be used or receivable against him in any civil proceedings, or in any proceeding under any Act of Alberta.

In all investigations by the Board, it has the power to request any member or members of the profession of which the accused is a member to sit with the said Board as assessor or assessors.

The Board is purely a Board of Appeal for members of the Legal and Medical Professions, except in cases where the disciplining body refuses to act or does not act properly or sufficiently, with the final result that the accused in the case of a medical man, instead of having a hearing before a judge of the Supreme Court, has a judge and four others who might be termed a jury with judicial powers.

AMENDMENTS TO THE ACT RESPECTING THE MEDICAL PROFESSION

The College of Physicians and Surgeons of Alberta applied to the Legislature to have the Medical Act amended, granting it similar powers to those granted the New Discipline Board, so that none of the Council's acts would be reviewed by the Discipline Board on the grounds that the Council had no power or jurisdiction.

The College now has the following added powers:—

It can erase the name of anyone who:—

(a) has been convicted of an offence punishable by more than one year's imprisonment under the Criminal Code of Canada, upon proof of such conviction,

(b) is insane or mentally incapacitated, and has been so found,

(c) makes written application to the registrar to have his name erased.

It can order the suspension of any member for three years, instead of one year as formerly. Before this change, if the offence was such that the Council thought one year's suspension was insufficient they had no alternative but to erase. This seemed to carry a finality that looked like a life-sentence, and the Supreme Court suggested a modification in the powers, hence the change.

Cases dealt with by the Council are no longer subject to appeal to the Courts or to the new Board, provided all the Council concurs in the decision; the new clause reads "provided there shall be no appeal from an order unanimously made by the Council."

The decision as to what constitutes, or does not constitute, "unprofessional conduct" is now a matter for the Council itself, and does not rest with any court of appeal whatever.

In taking evidence the Council is not hampered with all the legal technicalities as formerly and their decision cannot be thrown out for trivial things, when the facts warrant the council acting as they did. Instance the following:—

"Evidence may be adduced before the council or discipline committee either by affidavit, or *viva voce* or both, as the council or committee may determine, but no medical practitioner's name shall be erased from the register on affidavit evidence alone."

"The council or committee shall not be bound by the rules of evidence obtaining in actions and proceedings in the courts of justice, but on

the contrary, MAY PROCEED TO ASCERTAIN THE FACTS IN SUCH A MANNER AS IT SHALL DEEM PROPER."

It is quite clear from the above that the council cannot act in any arbitrary manner, but must base its decisions on THE FACTS, but has latitude in getting at them.

The Council has further the power to refuse registration of any applicant, if in the members' discretion it appears advisable, and on occasion can suspend any member from practising while an investigation is in progress, if the case warrants it.

With the added powers to the council it does not look as though many cases would be referred to the new Board, but in matters of discipline members will more than ever be in the hands of the elected representatives of the profession.

STERILIZATION ACT

This is somewhat limited in scope, dealing with patients in mental hospitals, who have been under treatment for some mental ailment.

"When it is proposed to discharge any inmate of a mental hospital, the Medical Superintendent or the officer in charge thereof MAY cause such inmate to be examined by or in the presence of the board of examiners."

"If upon such examination, the board is unanimously of opinion that the patient might safely be discharged, if the danger of procreation with its attendant risk of multiplication of the evil, by transmission of the disability to progeny, were eliminated, the board may direct in writing such surgical operation for sexual sterilization of the inmate as may be specified in the written direction, and shall appoint some competent surgeon to perform the operation."

"Such operation shall NOT BE PERFORMED unless the inmate, if in the opinion of the board he is capable of giving consent, has consented thereto, or where the board is of the opinion that the inmate is not capable of giving such consent, the husband or wife of the inmate, or the parent or guardian of the inmate, if he is unmarried, has consented thereto, or where the inmate has no husband, wife or parent, or guardian resident in the province, the Minister has consented thereto."

"No surgeon duly directed to perform any such operation shall be liable to any civil action whatsoever by reason of the performance thereof?"

"This Act shall have effect only insofar as the legislative authority of the province extends."

This Act provides for the appointment of a Board, which for the present is composed of the following,

Prof. E. L. Pope Professor of Medicine, University of Alberta.

Prof. J. M. McEachern, Professor of Philosophy, University of Alberta.

Dr. E. G. Mason, Calgary, and Mrs. Jean E. Field, Kinuso, Alta.

It appears as though this Bill will be limited in scope, as unless proper consent can be had and obtained, the operation may become one of assault, which comes under the Criminal Code of Canada, and then it will have to be shown that the operation was in the interest of the patient. It would surely be no argument that the patient bought his liberty by the operation, otherwise he would have to remain in the institution.

Eminent legal opinion was first obtained before the Act was passed, so we may safely leave the operation in the hands of the Government, which took the responsibility of putting the law on the statute books of the province.

Medico-Legal

A MEDICO-LEGAL STUDY

The following article, written by a prominent member of the Law Society of Upper Canada, was published in *The Canadian Bar Review* for February, 1928. The medico-legal case considered in it was given in a brief summary in *The Canadian Medical Association Journal* for January, 1928, page 115. We are glad to be able to print a study of this case from a legal point of view, through the kind permission of the editor of the *Review*. The study is of interest to the medical profession, not only on account of the incident itself, but also because of the legal analysis of the question of liability.

"The case of Beckh v. Sinclair, reported in *The Times* as being tried before the Lord Chief Justice of England, November 1 and 2, 1927, is of interest to members of both the legal and the medical profession. To the lawyer, it illustrates the fact that the Common Law of England, which is a systematization of the customs of the English people, cleared in some respects of unreasonable features by the common sense, and in a few other respects disfigured by the metaphysical subtlety of early judges, is flexible, and, while retaining intact its great principles, adapts itself to changed and changing conditions, following closely the evolution of the people themselves. To the doctor is brought home the fact that his art has undergone a course of evolution, and that a new profession has grown up beside him out of a handicraft, and calls for

complete recognition. Just as the surgeon grew out of and away from the barber, whose pole with its red and white stripes still represents the staff grasped by the patient being bled, and the white and red stripes, the clean bandage and the bandage wet with the patient's blood, so the nurse has grown out of and away from the servant waiting on the doctor; the maid has become the professional woman, and the registered (or certified) nurse is no more a Sairey Gamp or a Betsy Prig than the M.R.C.S. or the M.D., C.M. is a barber.

Miss Beckh sued Mr. Sinclair, a surgeon (surgeons in England do not as a rule take the M.D. degree, and some of those who have it do not call themselves "Doctor"): he had operated on her, making a sigmoidoscopic examination under an anæsthetic. On being consulted by her, he had said that he would require a nurse, and she asked him to select one. He sent Miss V., a certificated nurse, who was said to be experienced and competent, and she was employed by the patient the day before the operation. The nurse made known her requirements, including hot-water bottles, and they were supplied. At the operation, before the anæsthetic was administered, and indeed before the doctors arrived, three hot-water bottles were brought into the room, two with and one without a cover. Just before the doctors entered the room, the patient asked the nurse if she might keep the hot-water bottle which she was holding between her arms, and the nurse assented, intending to take it away after the anæsthetic should have been administered. She forgot. The anæsthetist saw the bottle lying on the patient's chest, and chaffed her about it; but the surgeon did not know of it at all. During the operation, the bottle slipped down, and after the operation, it was found that it had got down to the patient's knee and caused a painful and lasting injury before she recovered from the anæsthetic.

She sued the surgeon, contending that he was responsible for the negligence of a person who was assisting in the operation which she had employed him to perform. Her counsel, in opening to the jury, said: "If a surgeon delegates to a nurse the duty of placing and looking after the hot-water bottles at an operation, he is responsible if she performs her duties carelessly and causes injury to a patient. A nurse is under the orders and control of the surgeon alone from the moment when the door of the operating room is closed for the operation to begin." Counsel employed almost verbatim the language of Lord Justice Farwell in Hillyer *vs.* Governors of St. Bartholomew's Hospital, (1909) 2 K.K., 820, at p. 826.

The proposition stated in simple terms is this: While the nurse was engaged by the patient and paid by her, yet, *quoad* the operation, she was the servant of the surgeon, and he was therefore responsible for her negligence. *Qui facit per alium (aut per aliam) facit per se et respondeat superior.*

The Lord Chief Justice dismissed the action, and gave judgment for the surgeon and for his fees which he had claimed by counterclaim.

Before entering on a discussion of the judgment, a word or two may be said as to the practice. The case was set down to be tried before a Special Jury, a luxury which we in Ontario seldom indulge in; in over forty-five years of very active experience, I never saw one and have heard of only two. Moreover, as there was no question of fact involved, the case would have been tried in Ontario without a jury: (Town *vs.* Archer, 4 O.L.R., 383; Armstrong *vs.* Bruce, (1904) 4 O.W.R., 327, and such cases.)

The suggestion of the Lord Chief Justice, that "what happened might well have been a mere accident," and there might be a "question whether there was any real negligence on Miss V's part," is rather startling, and would probably not receive a moment's consideration in our Courts. She knew that the hot-water bottle would do injury, if it were not removed; she consequently intended to remove it, and then, without excuse, she forgot to do her plain duty. It may be added that she, herself, admitted her fault, and could offer no excuse but that she forgot. However, this suggestion forms no part of the judgment, and it is to be hoped that no nurse will be tempted thereby to forget to do her duty.

As regards liability on the part of the surgeon, it was not a case, as it might easily have been, at least some years ago, of a surgeon engaged to perform an operation bringing with him a person, nurse or otherwise denominated, engaged and paid by him, and supplied by him as much as his instruments or anæsthetic. In such a case it would probably not be doubted that he would be liable for her default, negligence or ignorance. There is no magic in the word "nurse," and a nurse may be a servant to a doctor or hospital and render the master liable. (Lavere *vs.* Smith's Falls Public Hospital, (1915), 35 O.L.R., 98; approved in the Supreme Court of Canada in Hyberg *vs.* Provost Mun. Hosp. Board, (1927), 1 D.L.R., 969.) The liability, properly speaking, depends on the contract, expressed or implied, of the surgeon, and that must be determined by the facts of the case. It may well be that all the surgeon may promise or undertake is to supply a nurse, and not the nursing, which is quite a different thing, or may be. If all he was to do was to "supply" a nurse, whom the patient might or might not engage, he would not be liable for the nurse's default. Such a case was Hall *vs.* Lees, (1904), 2 K.B., 602, where the defendants contracted only to supply a nurse, and not nursing, as was the case in the Lavere-Smith's Falls action.

In the recent English case there was no claim that the surgeon had given improper directions to the nurse, as was alleged in the action of Armstrong *vs.* Bruce, (1904), 4 O.W.R., 327. That the nurses "assisting at an operation . . . . .take their orders during that period from the operating surgeon alone" cannot be a matter of doubt on the English or Ontario cases (Hillyer *vs.* Governors of St. Bartholomew's Hospital, (1909), 2 K.B., 820 at p. 826: Laverne *vs.* Smith's Falls Hospital, (1915), 35 O.L.R., 98 at p. 107), and it necessarily follows that the surgeon is responsible for the consequence of an improper order given by him to the nurse and by her carried out. In the Armstrong case it was alleged that the surgeon had directed the nurse to place a Kelly pad with boiling water under a patient about to be operated on for strangulated hernia. She undoubtedly did so with the result which was inevitable. It was not contended by the defendant that, if he had in fact given such an order, he would not be liable; but he said that what he had instructed the nurse to do was to fill the pad like a hot-water bottle, not as she asserted with boiling water. The Trial Judge, Meredith, J. (now C. J.) believed the surgeon and dismissed the action.

Is the surgeon, in the absence of direction by him, liable for the negligence of the nurse? If she is part of his "plant," part of the material to be furnished by him, his servant *pro hac vice*, undoubtedly he is. Let the master answer for his servant. But if not, he is not. This must follow from the present status of the assisting nurse, and the present routine of operative surgery, largely due, be it said, to the efforts of Pasteur and Lister. No longer does the operating surgeon throw off his coat and breezily go to work in his shirt-sleeves, with a knife just wiped off on chamois, someone standing by to lend a hand if required, nurse, helper, or otherwise named. He and his assistants are robed, masked and gloved with sterile material. Once prepared, none may touch a speck of dust, for that might endanger the life of the patient; none may adventure an examination of bed, table-warmer, hot-water bottles. An "unsterile" nurse has to do for the patient what surgeons and "sterile" nurses may not, arrange the bed, place hot-water bottles, etc.

Nursing is no longer a trade or a handicraft; it is a profession, and nurses are trained in their duties in an operation as carefully as the surgeon himself. They, consequently, require no instructions or orders from the surgeon, except in unexpected emergencies. They must, indeed, hold themselves in readiness to receive and obey his orders, if he has any to give, but must be competent to get along without orders, unless and until he sees fit to give them. As Douglas Armour (who was once "Dr." but is now "Mr.") puts it: "A modern surgical operation is a ritual. . . .every detail of which must be carried out with meticulous care. Those who are present at an operation constitute a team, each member of which is trained in his own duties . . . .A surgeon does not interfere to see whether the other members of the team have carried out their particular duties. The preparation of a patient for the operation is entrusted to the nurse, including the task of seeing that hot-water bottles are not in dangerous proximity to him." Or, as the eminent Toronto practitioners said in the Armstrong case, "When an operation was to be performed aseptically, it would be gross negligence for the operating surgeon to touch anything which had not been sterilized, that it was his duty to sterilize his hands with great care, and thereafter to touch nothing which had not itself been sterilized . . . .The proper heat of water to put in a hot-water bottle is a matter of familiar knowledge amongst nurses. . . .a matter which they are carefully taught in hospitals. . . . It would be impossible for the operating surgeon to attend to the details, and he must trust to the knowledge of trained nurses." And as the late Dr. George Bingham—*valde dilectus, valde deflendusque*—said in the same case: "If I cannot trust my nurse, I must give up aseptic surgery."

A surgical operation is not now, and cannot safely be, the simple case of a contractor and his servants performing a work which he has contracted to do, as in the Lavere case; but separate contractors, each with his own separate contract, although one of these may and is subject to the orders of another, who has the right and, in some cases, the duty to direct him. In the Beckh case, it was not the duty of the surgeon to direct the nurse as to the hot-water bottles. Cases may easily be conceived in which a duty would arise for the surgeon to give specific directions to the nurse, and failure to give the proper instructions might well give rise to a cause of action; but that is neither the Beckh nor the Armstrong case.

I confess my inability to understand the conduct of the anæsthetist. He saw the bottle on the patient's chest, and why he did not feel called on to make an examination, which would have revealed the dangerous heat of the bottle and so have averted the unfortunate accident, I do not see. But the surgeon was no more responsible for the negligence of the anæsthetist, if there was such negligence, than for that of the nurse."

XUM

Men and Books

THE MEDICAL SCHOOLS OF TORONTO*

BY A. H. WRIGHT, M.D.

Toronto

It is difficult or impossible for the observers of public matters in Ontario to-day to form a correct opinion as to the conditions in Upper Canada from 1820 to 1860. The game of politics was more strenuous one hundred years ago than it is at the present time. The medley of questions pertaining to higher education, land and money grants, the diversified opinions of the various religious denominations, the alarming situation in politics, and the rebellion of 1837, created conditions quite extraordinary, associated with almost endless controversy of the bitterest kind.

The educational difficulties began with an attempt to establish a university organization on purely British lines, which were not acceptable to the majority in Upper Canada.

Bishop Strachan, a man of fine character and great ability, was so prominently associated with the establishment of two medical faculties that it seems fitting to give something of his life history. Mr. John Strachan, not a clergyman, as many suppose, but simply a schoolmaster, came from Scotland to Canada, on the invitation of Governor Simcoe, acting on advice from the motherland, to assist in the organization of a number of grammar schools and a state university for Upper Canada. As a boy he had completed a course in the University of Aberdeen, then at the age of nineteen had settled down as a schoolmaster in Fifeshire, where he taught with great success.

When he reached Canada, on the last day of 1799, he went first to Kingston, where he met Mr. (afterwards Sir Richard) Cartwright. But Governor Simcoe had been removed from Canada by the Home Government, which meant that the university project was postponed.

Mr. Strachan then spent three years at private tuition, after which he entered the ministry of the Church of England, and in 1803 went to Cornwall, where for nearly ten years he discharged double duties, as a clergyman of the parish, and as headmaster of the Cornwall Grammar School, which gained under him a high reputation.

In 1812 he removed to York (Toronto), where he acted as rector of the parish, and headmaster of the Home District School until 1823. He became Bishop of Toronto in 1839 at the age of 61, and remained so until his death in 1867. While originally he was brought to Canada at the age of twenty to assist in the establishment of a university, he had to begin lower down. He was for about forty years in Kingston, Cornwall, and Toronto before he was made a bishop. None, therefore, had a more intimate knowledge of educational matters in Upper Canada than he.

The first medical school in Toronto (also in Upper Canada) was the Medical Department of King's College, of which Bishop Strachan was president. On the teaching staff were Drs. King, Gwynne, Beaumont, Herrick, Nichol, Hodder, Richardson, Boys, Sullivan and

BISHOP STRACHAN

O'Brien. Arrangements for the school were completed early in 1844. The majority in the province were not in sympathy with it, because they disapproved of King's College, which, though the charter had been granted in 1827, had not been opened to students till 1843. During all these years there had been controversy regarding the exclusiveness of the charter, though this was slightly amended in 1837.

In the year 1836 the Church of Scotland contemplated establishing what was to be merely a theological seminary, but in 1841 a university was established and opened to students in 1842. The Upper Canada Academy of Cobourg, which had been built by the Methodists at a cost of

* Read at the Stated Meeting, Academy of Medicine, Toronto, January 3, 1928.

about $40,000, was made a university in 1841. A few years later came the University of Trinity College; and, afterwards, others that need not be mentioned now.

The new organizations, and the differences of opinions among them, affected seriously the questions of providing facilities for the professions, especially Divinity, Medicine and Law. There was supposed to be a popular sentiment against state aid for a lucrative profession.

Let us now consider the formation of the second medical school. When King's College was abolished by the Act which came into operation early in 1850, Bishop Strachan went to England to seek assistance for the establishment of a Church institution—the University of Trinity College. During his absence Drs. Hodder and Bovell organized a medical school under the title of The Upper Canada School of Medicine. With them were associated Bethune, Hallowell, Melville and Badgley. When the Bishop returned in the fall of that year, a deputation went to him, tendering the services of those mentioned, gratuitously for the time being, as a Medical Faculty in the new University. His Lordship readily accepted the offer, and arranged for the formal opening, when the following professors delivered short addresses: Hodder, Bethune, Bovell, Hallowell and Melville. The Church newspaper commented: "Seldom, if ever, has our Province witnessed a more interesting event." The Bishop's address was impressive. Ten years before he had laid the foundation stone of King's College, when "I truly felt that it was the happiest moment of my life." He was now full of hope that the new institution with its medical faculty would have a great and prosperous future.

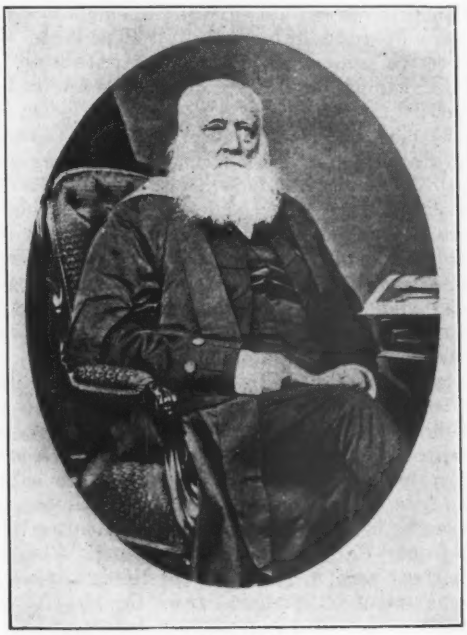
But alas! Another disappointment came to his Lordship. Serious friction arose between the Council and the Faculty, the exact nature of which I have been unable to discover. The reason given was a disagreement about certain advertisements. The Faculty contended there was nothing wrong about them. "However, being convinced that all our efforts to advance the interests of Trinity College meet with repeated rebuffs, we beg leave to enclose our commissions (Signed) Hodder, Bovell, Bethune, Badgley, Hallowell, Russell." The Council tendered thanks to the Faculty, and resolved: "that the resignations be accepted." Thus, through misunderstandings between two high-minded and honourable groups of men, an admirable faculty was destroyed within six years after its establishment.

I learned these particulars from Lloyd Hodgins, A. H. Young of Trinity College, and Henry Melville's book on "The Rise and Progress of Trinity College." Norman Gwyn also found the following in the records: "We, (the faculty) were just beginning to reap the fruits of our labours, and were seeing well-trained men going out into the world." From other sources comes an opinion that the Medical Faculty did not receive fair consideration from the governing council. There was certainly dissatisfaction in the teaching staff, and some of the professors, including Hodder and Bovell, joined the Toronto School of Medicine (the Wright-Aikens school). Probably at the same time Hodder and Bovell surrendered the charter of the Upper Canada School of Medicine.

About the same time the Medical Faculty of King's College was destroyed by the Hincks Act of 1853. We are told that John Rolph, who was then a member of the Hincks Government, had much to do with this feature of the Act; but we believe that the general opposition to state aid for any lucrative profession, before referred to, had considerable influence.

We may now consider the history of the proprietary medical schools of Toronto, concerning which there has been much confusion. Mr. Wallace, the Librarian of the University, however, has done much to untangle the tangle.

The first proprietary school was probably Rolph's School of Medicine, incorporated in 1851



DR. JOHN ROLPH
Dean, Rolph's School of Medicine

under the title of the Toronto School of Medicine.

Shortly after I entered University College in 1862, I went with a medical student to hear a lecture on Medicine. The lecturer, John Rolph, had a fine appearance, a clear silver voice, and an impressive manner. I followed him with

deep interest throughout, though unable to understand every word; and I considered it one of the two best addresses I had ever heard, the other being one delivered by Dr. McCaul, the President of the University.

John Rolph was born in Gloucestershire, England. He came to Canada in 1812, and engaged in the war between the United States and Canada. At the close of the war he returned to England, and studied in Cambridge and London law and medicine, probably concurrently so far as possible. He was called to the Bar of the Inner Temple, and also became qualified in Surgery, as M.R.C.S. Eng. He returned to Canada in 1821, when twenty-eight years of age. Soon afterwards he was called to the Bar of Upper Canada.

Before the end of that year he went to the Township of Charlotteville, County of Norfolk, where he was for some time engaged in the practice of law and medicine. He also took a prominent part in public matters, and was elected a member of the Legislative Assembly for Middlesex County. Afterwards he was re-elected twice, once for Middlesex, and once for Norfolk. He removed to Dundas about 1825.

It can be readily understood that Rolph did an enormous amount of work during the seven years he resided in Norfolk. His large and lucrative practice in law led his friends to believe that he would soon devote himself to law and politics. He was considered by some the most eloquent legal counsel in Upper Canada; but his career as a lawyer suddenly terminated in 1828, when, dissatisfied with a legal decision of Justice Sherwood, he threw off his gown, left the court, and thereafter devoted himself exclusively to the practice and teaching of medicine. He went from Dundas to Toronto in 1851 and soon formed private classes for instruction in medicine. Among his students were H. H. Wright and J. H. Richardson.

In 1837 he joined in the MacKenzie rebellion, left the country, and lived in Rochester until 1843, when he returned to Toronto, and resumed medical teaching in what soon became known as Rolph's School. In 1848 he gave his school the title of the Toronto School of Medicine, the teachers being Joseph Workman, George Park and John Rolph. This school, though it had no charter, was a rival of the King's College Department of Medicine from the time it was opened. In 1852 it was duly incorporated as the Toronto School of Medicine. Therefore, we are told, he laid his plans to kill King's College Faculty of Medicine.

Rolph and the members of his new faculty soon had differences, and a disruption occurred when, at the first of the term in October, 1856, six of the faculty of seven resigned, leaving Rolph to carry on alone. This he at once proceeded to do until he procured men to fill the vacancies, which he soon accomplished; but, we are told, the new men "picked up in the streets" were not all of high calibre. However, Rolph continued the struggle and improved matters to some extent, though his staff was thought to remain weak in spots.

The retiring members, being a majority, claimed the "Corporation" with its title, The Toronto School of Medicine, and won their case in the courts. Under the leadership of W. T. Aikins and H. H. Wright, the new Toronto School of Medicine was established, and gave its support chiefly to the University of Toronto, while the other body, continuing operations under the title of "Rolph's School of Medicine" remained practically the Medical Faculty of Victoria, though never strictly so. Before long, however, some of the Rolph's students went to Toronto University for their degrees, while some of the Toronto School students went to Victoria.

We shall not attempt to give details, of which we have but little knowledge, regarding the differences between Dean Rolph and the members of his faculty. But, the Dean was the person who in 1831 threw off his gown in the court room and relinquished a profession in which he appeared to be making good. He held his school together in a sort of fashion till he was about eighty, when his strength failed, his silver voice became silent, and he was compelled to stop lecturing. He remained Dean about two years longer, when in 1869 he resigned, and William Canniff was appointed in his place. During the last year of his deanship, he could do no work, but he retained enough of his faculties to understand the situation, to look round over the structure which had been the chief work of his life, and see it crumbling into ruins. He died in Mitchell in 1870, at the age of eighty-three, and his school soon ceased to exist.

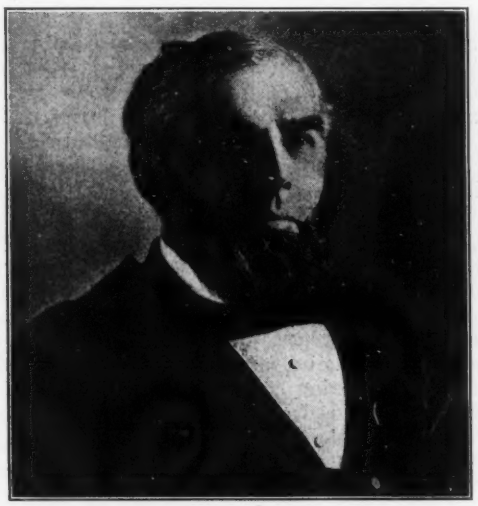
A new Medical Faculty, Trinity College, was established in 1871, with Dr. Hodder as Dean, which position he retained until his death in 1877. As it is probable that it never came actually under the control of the Council of Trinity College, the situation was not quite satisfactory. With the consent of all parties it became incorporated under an independent charter as Trinity Medical College in 1877, and W. B. Geikie was elected Dean in 1878.

Dr. Geikie was licensed by the Board of Upper Canada in 1851; graduated M.D. from Jefferson, Philadelphia, in 1852; practised a few years in Aurora; then removed to Toronto, and became Professor of Materia Medica in Rolph's School. Later he held the chairs of anatomy, surgery and midwifery. Like Rolph, he could lecture on anything and everything, if required. When he became Dean of Trinity, he put into his work much ability and a tremendous amount

of energy, thus doing much to promote the success that attended that school.

From 1878 we had for a number of years two typical proprietary schools, both of which had much good teaching capacity. They worked side by side for several years, with what may be correctly termed friendly rivalry. This was especially noticeable in their co-operation in their duties in the General Hospital; there they were friends, not rivals.

These two schools were in good working order and the financial conditions were satisfactory in 1886. The prospects in Toronto were better than at any time for twenty years. The outlook for Trinity was quite as good, perhaps a little better. Great credit is due to Drs. W. T. Aikins and H. H. Wright for their attitude in the negotiations, and, fortunately, they were supported well by the majority of their colleagues. It may surprise some when I say I was never a member of the "corporation," nor did I ever attend a



WILLIAM THOMAS AIKINS, M.D., LL.D.
Dean, Toronto School of Medicine

faculty meeting of the Toronto School of Medicine. I thought of joining once when I had an opportunity, but there seemed to me to be no occasion for it, as I preferred to remain free to work on the university side as a member of the Senate, but I simply did the work assigned to me as a sort of receiving teller and floor manager during lecture hours, with satisfaction to myself, and, I think, to the members of the faculty, with whom my relations were always very pleasant.

The following quotation, from an article written by Sir Daniel Wilson, will give a fair idea of the aims and desires of the University.

"In taking the necessary steps for the reorganization of a Medical Faculty for the University of Toronto, the Senate recognized the justice of making the first offer to the medical schools already in affiliation with it. This was the more desirable owing to the anticipated federation of Victoria College with the University of Toronto. One of the results of the abolition of the old Medical Faculty of the university has been the somewhat anomalous practice of the majority of the medical students educated in Toronto resorting to Cobourg to obtain their degrees. A cordial invitation was extended on precisely the same terms to enter into union with the university for the purpose of forming one efficient Medical Faculty."

The committee of the Senate appointed to consider the matter met March 18, 1887: the following being present; Vice-Chancellor Mulock (Chairman), Sir Daniel Wilson, Sir Matthew Cameron, Reverend Principal Cavan, Hon. Justice Patterson, Hon. Justice Falconbridge, Rev. Father Vincent, Hon. John Macdonald, Professor Galbraith, W. A. Foster, Q.C., C. Moss, Q.C., William Houston, M.A., Drs. John Fulton, Oldright, McFarlane and A. H. Wright. They framed their report much on the lines laid down by Sir Daniel Wilson. In consequence of certain questions asked by Dr. Fulton, they included the following clause: "The present salaries of professors shall be maintained *pro rata;* and for the purpose of defining what is understood by salaries, the scale at present existing in Trinity Medical School shall be taken as a basis; and a practicable scheme for retiring allowances shall be arranged."

This meeting was held at my residence, 30 Gerrard St. East; and, on the following day, Dr. Fulton called to see me at my office to discuss certain details. He appeared to consider that the offer of the university to the schools was fair and reasonable, but expressed no opinion as to the action his faculty would take. I think he died a few weeks after, in May, from pneumonia; and I never heard whether or not he expressed any definite opinion to Trinity Corporation as to the advisability of acceptance of the offer. Trinity said "No"; and the Dean unfortunately wrote many letters to the Government and the press which were not friendly in tone. This decision caused great disappointment to the majority of those interested in higher medical education.

The subject came to the front again in 1900, thirteen years later, when Dr. McKay, of Woodstock, introduced in the Ontario Legislature a bill, relating to medical colleges in affiliation with the University of Toronto. There was considerable public discussion engaged in by Trinity professors, Drs. Geikie, Teskey, Davison, Powell and Wishart; and Toronto professors and members of the Senate, Drs. A. B. Macallum, I. H. Cameron, A. H. Wright, Principal

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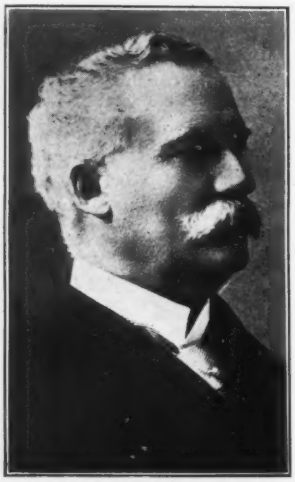
Cavan and others; not as a rule controversial in character. Many concluded that the proper solution was amalgamation.

For two years, or a little more, the feeling in Trinity grew in that direction, notwithstanding the strenuous opposition of Dean Geikie, who apparently became disheartened and angry because of the changed sentiments of his colleagues, and tendered his resignation, which was accepted, Dr. Temple being elected in his place. Trinity's changed attitude was not due to fear of failure. Temple and his colleagues believed,



DR. J. ALGERTON TEMPLE
Last Dean Trinity Medical College

as did Aikins, Wright and their fellow members, that proprietary medical schools should pass out of existence.

After certain negotiations, a joint committee was formed: Temple, Davison and Powell for Trinity; Reeve, Cameron, and A. H. Wright, for Toronto. At a meeting held in Cameron's house, the committee agreed on a plan for amalgamation, which was accepted in 1903. One can scarcely say that the amalgamation thus consummated was entirely satisfactory, because it was in a way an absorption, instead of a perfect fusion or partnership on equal terms, as I believe it would have been if accomplished sixteen years earlier. Both parties, however, endeavoured to be perfectly fair, and one can say the situation is now quite satisfactory, and has been so for at least five years.

Trinity, which had gone its way as an independent university for over fifty years, entered into federation with the University of Toronto early in 1903, and that made the amalgamation of the two medical faculties desirable, a fact fully appreciated by Temple and the majority of his colleagues.

The Woman's Medical College of Toronto was organized by Dr. M. Barrett, assisted by Drs. Nevitt, Reeve, Stowe-Gullen, Mrs. McEwen and some others, in 1883. The scheme was popular, because coeducation had not been successful, and it was thought that if women wished to study medicine they were quite within their rights, and proper facilities should be provided for them. The school was quite successful, but as the customs and manners of young men students had improved in recent years, especially in the University of Toronto, the women students quietly passed into that institution about two years after the Trinity amalgamation. However, to guard against the repetition of the unpleasant dangers of the past, they considered it prudent to retain their charter. The women students of the university are now so well satisfied with existing conditions that they think it improbable that it will ever be deemed advisable to return to the old charter.

Correspondence

Our Edinburgh Letter

(From our own correspondent)

The Caledonian Medical Society has just celebrated its Jubilee, at a meeting held in Edinburgh under the joint Presidency of Dr. S. R. Macphail and Dr. W. A. Macnaughton, the two survivors of the three original founders of the Society. On Thursday, February 23rd, the annual dinner was held in the Hall of the Royal College of Physicians. Dr. Macphail presided over a company of one hundred and twenty members and guests, including the Moderator of the Church of Scotland, the Lord Justice Clerk, the Presidents of the Royal College of Physicians and the Royal College of Surgeons (Dr. R. A. Fleming and Mr. Alexander Miles) and the Dean of the Faculty of Medicine, (Professor Lorraine Smith). On Friday 24th, a meeting was held in the Royal College of Surgeons, when Dr. W. A. Macnaughton read his presidential address. The subject of his dissertation was "Then and Now." In referring to the figures recently given by a contributor to the *Scotsman* regarding the cost of a university education in Scotland, Dr. Macnaughton pointed out that the figures as shown varied between 30 shillings and £2 per week for the present day. In his day his landlady's bill seldom exceeded one-third of that figure. In Aberdeen, fifty years ago, the cost was even more modest, for a graduate of the northern university of that

period assured him that his weekly bill seldom exceeded 6s ($1.50) a week. Dr. Macnaughton referred to the vast changes that had taken place in the Medical Services in the Highlands and Islands since 1878. The establishment through local endeavour of a number of cottage hospitals in various parts of the Highlands, and the appointment of highly qualified surgeon-consultants had completely altered the aspect of affairs. In the afternoon the University of Edinburgh gave a reception to the Society in the Upper Library Hall. The guests were received by Principal Sir Alfred Ewing. An address on "Some Medical Manuscripts in the Possession of the University" was given by Dr. John D. Comrie, the lecturer to the University on the History of Medicine, when a number of rare books and manuscripts of antiquarian and medical interest were shown. It is of interest that this Society, founded by three Highland medical students fifty years ago, has now a membership of 483, of whom 197 are life members.

The annual curling match between the College of Physicians and the College of Surgeons was played in the Haymarket Ice Rink on Tuesday, February 14th. After a close match the Physicians won by a majority of 7 shots.

The Corporation of the City of Edinburgh, in a Bill at present before Parliament, is seeking for new powers for the control of venereal disease. One of the provisions of the Bill, which has given rise to considerable controversy, is to give the magistrate power, on a certificate from the Medical Officer of Health, to issue a warrant for the compulsory treatment of a person suffering from venereal disease. The Bill seeks to give the Medical Officer of Health power to order a person to undergo treatment. The Corporation claims that the venereal disease scheme as at present administered is not yielding results commensurate with the expenditure involved. During the five years 1921-26, 5,129 patients ceased attending for treatment before they were considered to be cured. The Public Health Authority considers that, viewed from the public health aspect, it is far from satisfactory that it should be powerless to deal with these cases. As a result of so many cases failing to complete their cure, there is not only a wide spread of infection, but also very considerable sums of money are being expended without adequate return. The Executive Committee of the Edinburgh and Leith Division of the British Medical Association on February 18th, passed a resolution in support of the proposal of the Edinburgh Corporation. The matter came before a meeting of the Division on February 28th, which confirmed the resolution favourable to the Bill by a majority of 39 votes to 11. On March 2nd a public meeting was held in the Usher Hall, presided over by Lord Balfour of Burleigh, and addressed by Lady Astor and Dr. Graham Little, M.P. A resolution was passed by a large majority of the audience, which numbered more than 1,500, that "The measure was ill-advised, unwarranted and unnecessary, and likely to prejudice the progress made in the treatment of these diseases under the existing and voluntary methods." Whether the Corporation is successful or not in obtaining the new powers it is obvious that the passage of this Bill through Parliament will be watched with lively interest.

Two new professors have recently been appointed in the University of Edinburgh. Dr. W. T. Ritchie has been elected to the Chair of Medicine in succession to Dr. G. Lovell Gulland. The new professor is a Physician to the Royal Infirmary, an Honorary Consultant to the Ministry of Pensions, and an Examiner to the University of Saint Andrew's. He was the Gibson Memorial Lecturer to the Royal College of Physicians in 1923. Dr. Ritchie is an authority on cardio-vascular troubles and is the joint author of two books; one on "Diseases of the Heart," written in conjunction with Dr. John Cowan of Glasgow; and the other on "Medical Diagnosis," in collaboration with the late Dr. Grahame Brown. Dr. James Kendal, F.R.S., has been chosen to succeed Sir James Walker in the Chair of Chemistry. He was until recently Professor of Chemistry at Columbia University, New York.

The Leith Hospital Board of Management has received a sum of £1,500 from an anonymous donor to endow a cot in the children's wing of Leith Hospital, as a mark of homage to the late Earl Haig.

In presenting his annual report, Professor G. M. Robertson drew attention to the fact that Royal Assent had been given to altering the name of the "Royal Edinburgh Asylum for the Insane" into the "Royal Edinburgh Hospital for Mental and Nervous Disorders." He pointed out the changed conditions under which patients are admitted for treatment. Twenty years ago, 317 patients were admitted to this institution, and of these only 8, or 2 per cent, entered for treatment as voluntary patients. Last year there were 239 admissions and of these 148 or 62 per cent entered voluntarily. The institution might have been described twenty years ago as a place of detention, but this can no longer be said with truth when nearly two-thirds of those who come for treatment come voluntarily. It is found that voluntary patients are admitted for treatment sooner than certified patients, that they come when their malady is more recent and less serious, that they are more contented to be treated, and that a larger proportion of them recover. Dr.

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Robertson drew a striking parallel between the psychiatric crusade which is now being conducted in favour of early treatment and the successful campaign against tuberculosis started in Edinburgh under the auspices of Sir Robert Philip. Forty years ago, patients were sent to hospitals with cavities in their lungs and in the last stages of the disease. Arrangements were therefore made to discover the disease at an earlier and more hopeful stage; out-patient clinics and dispensaries were instituted, finally the family and the home came under review for early and preventive treatment. Dr. Robertson expressed the hope that psychiatrists should profit by this good example and do likewise.

GEORGE GIBSON.

23, Cluny Terrace, Edinburgh

Our London Letter

(From our own correspondent)

National Health Insurance Changes.—Mainly based upon the majority report of the Royal Commission on Health Insurance a Bill has been presented to parliament by the Minister of Health, which is to amend the present legislation. The bill is mainly concerned with administration and organization, but it contains certain points of importance to the medical profession. The position of the unemployed with regard to health insurance is now to be made quite clear and definite: all persons ceasing to be employed are to remain fully insured for an average period of one year and nine months. The other important feature of the new bill is the list of "additional" as distinct from "statutory" benefits which it gives. Some of these have already been allowed by regulation since the Act of 1924 and some are new. It is satisfactory to have them listed when it is considered that approximately four million pounds are expended annually by about 7,000 societies on these benefits. Such additional benefits not appearing in the Act of 1924 include the payment of part or whole of the cost of convalescent home treatment, medical and surgical appliances, ophthalmic treatment, and the provision of nurses. It is noticeable, however, that three important recommendations of the Commission on the extension and improvement of the insurance service have not been adopted. These are the provision of expert medical advice and treatment for persons who can travel to meet the specialist, expert advice for persons who are unable to travel and laboratory services. It was well recognized that such an extension would cost money but the necessary suggestions for the financial aspect were made but have not been adopted. While the new bill is all to the good as an amending measure it is received by the medical profession with definite disappointment.

Women Medical Students.—The press is having a lively time over the decision of certain London medical schools to terminate the temporary admission of women medical students. Four of the London hospitals have always restricted their students to men: St. Bartholomew's, Guy's, Middlesex and St. Thomas's. Some six others admitted women mostly during the war as a temporary measure and now they wish to terminate the arrangement. Unfortunately for these hospitals, which have a good if somewhat reactionary case, the argument seized upon for comment was the futile one that when women were admitted to a medical school the standard of athletic games played by the men went off! This has justly roused the fire of the feminists while many business men have also been moved to make their usual comments on the inefficiency of organizations not run on business lines, so that it will be hard work to bring the discussion back to fundamentals. Broadly speaking the arguments are that men dislike working with women in many parts of the work and many teachers dislike mixed classes; added to which is the fact that at least 50 per cent of women who qualify never practise medicine. In this connection the disqualification of married women for certain appointments must in fairness be remembered, and the whole discussion seems at times to be fifty years out of date. However the Senate of London University has taken a hand in the matter, and a special committee is sitting to consider the whole question. Meanwhile the press interviews all and sundry, and the results are causing a lot of amusement.

The Problem of Ethyl.—This problem has nothing to do with the one in the preceding paragraph although the posters announcing that "Ethyl is coming" were for a long time thought to herald a new film star! However ethyl is here and Sir William Pope in a letter to the *Times* has called public attention to the possible dangers attending the use of ethyl petrol. The matter has been raised in Parliament and it was learnt that the Ministry of Health is the department concerned. (This is not so obvious as it sounds, for patent medicines, for example, appear to be, at least in part, dealt with by the Treasury!) It is stated officially that tetra-ethyl lead petrol is to be allowed because latterly no cases of poisoning have occurred. In this connection the work of several bodies of investigators in the United States of America has been quoted to show that neither the Bureau of Mines nor the Surgeon-General's committee found that the use of "ethyl gasoline" should be prohibited provided its distribution and use were controlled by proper regulations. The latter committee, however, strongly urged the need

for further investigations. It has been suggested that while death and severe poisoning by lead petrol are not found to occur in ordinary circumstances yet cases of mild poisoning may pass unrecognized and also that the motoring advantages can be obtained by the use of mixtures free from the dangers of the ethyl variety. Whatever be the truth of these matters the government has decided to set up an inter-departmental committee to investigate the whole problem.

ALAN MONCRIEFF

London, April, 1928.

Topics of Current Interest

THE USE AND ABUSE OF ULTRA-VIOLET RADIATION THERAPY

REPORT OF A DISCUSSION AT MEETING OF MEDICAL SOCIETY OF LONDON, FEBRUARY 13, 1928

In introducing the subject, Dr. Leonard Hill began with a reference to other radiations. Much nonsense he said was talked about infra-red radiation therapy. The infra-red rays were nothing but heat rays such as were obtained with a hot-water bottle or fomentations. These had exceedingly little power of penetration, and were absorbed chiefly by the water in the outer layers of the skin. The visible rays—light—had greater power of penetration, especially the rays in the red portion of the spectrum. If a powerful source of incandescent rays were used, and the infra-red rays cut off so as to avoid over-heating, a penetration of some depth below the dermis might be secured. The energy of the visible rays was turned into heat in the blood, and possibly had some other action in the blood of which nothing at present was known. The ultra-violet radiations might be of long, medium, or short wave-length. They covered the region from 4,000 to 2,000 Angström units. There was no need to consider radiations beyond the 2,000 limit, because these were absorbed by the oxygen of the air. The sun gave no rays shorter than about 2,900 Angström units, but artificial sources like mercury vapour lamps or long-flame arcs extended the spectrum right down to the 2,000 limit. The biological evidence showed that the region round about 3,000 had the principal action on the skin in causing sunburn and in activating ergosterol and producing antirachitic vitamin. The shorter the wave-length the greater the killing power for bacteria and infusoria. The long ultra-violet radiations, from 4,000 upwards to 3,000, were not absorbed to any great extent by living tissues; at about 3,000 they passed through the horny layer of the epidermis, being largely retained by it, and were almost completely absorbed by the living cells of the dermis. The maximum biological action was at about 2,970, just where the high sun reached on a very clear day. Artificial sources acted mostly with rays shorter than 3,000, and the sun with rays mostly longer. Pigment was not a great protection against ultra-violet, but it was a defence against the visible rays; the pigment was in the deeper cells of the epidermis, and its function was to prevent over-heating of blood by light. Of all the methods of stimulating the defensive mechanism of the body none was more excellently adapted than ultra-violet radiation, which could be very carefully graduated and distributed over such areas as one pleased. Harm was done by over-dosage, just in the same way as exhaustion was produced by excess of sunlight. The temporary discomfort or illness which persons might experience after over-use of ultra-violet baths was of the same character as that which followed imprudent exposures at the seaside; but in acute disease such as phthisis much harm might be done.

Dr. W. J. O'Donovan said that the fact that light treatment had been going on at the London Hospital since 1900 without a day's discontinuance—except for the deplorable behaviour of the electricians in the general strike—was greater proof of its efficiency than any mass statistics of therapeutic results, which might rightly be distrusted. Furthermore, artificial sunlight therapy, both by arc and mercury vapour lamps, was introduced into the hospital in 1922, and there was not the slightest indication that it was failing to produce its cures. The speaker then mentioned a number of skin conditions in turn. Light therapy for lupus must be both general and local. The destructive work of the tubercle bacillus was slow, and the cure must necessarily be tardy also. Nodule after nodule of lupus could be picked out by Finsen light, or by its more destructive, less elegant, and less manageable substitute, the Kromayer lamp, and the time required could be shortened considerably and the cure made more certain by the daily administration of active light therapy. If light had served only to banish x-rays from the therapeutic field of lupus it would have justified its place. The immediate results of x-rays were often gratifying, but the later results of atrophic, vascularized, pigmented, and ugly scars were not pleasing. As to lupus erythematosus, he could confirm from his own experience what was the traditional teaching of the London Hospital clinic—namely, that light treatment for this condition was a waste of time and effort. His impression of the value of actinotherapy in cases of acne was distinctly discouraging. In widespread cases of psoriasis

he had completely cleared the lesions and obtained two years' freedom from relapse by a steady daily dosage from the mercury vapour lamp. Nevertheless, each case had relapsed to a greater or less extent in the course of time. It was his practice always to combine light therapy with vigorous inunctions of ointment and the use of the rest of the dermatologist's armamentarium. Actinotherapy had proved to be a most valuable weapon for combating pruriginous conditions. It was his opinion that many of these, whether accompanied by cutaneous manifestations of lichenization or no, were psychic in origin. In this he included cases of pruritus ani, pruritus scroti, pruritus capitis, and such conditions as lichen axillaris and lichen circumscriptus. All these benefited patently by general daily light baths, and where the irritation was intense and localized the patients all derived benefit from as large a local dose of mercury vapour radiations as could be tolerated without acute discomfort. It was with pleasure that in this field a dermatologist was able to turn from x-ray treatment to local actinotherapy, with results which were gratifying to the patient and a relief to the conscience of the operator. He was doubtful as to the value of light therapy in ringworm. In certain cases of eczema, following the exhibition of ultra-violet light, there developed occasionally a most intractable exfoliative dermatitis. In seborrhœa, apart from simple lesions, which responded quickly to sulphur ointments, x-ray epilation was of primary importance, and after that relapse could be prevented and cure hastened by the general administration of very small doses of ultra-violet radiation, not exceeding half a minute to each side of the body daily in the first instance. In three cases of post-herpetic pain in elderly patients the condition became quite tolerable within a week of daily administrations of local ultra-violet radiation baths. He had also found actinotherapy useful in dealing with the wide wounds after surgical incision for carbuncle.

Dr. C. B. Heald took some exception to Dr. Hill's remark that the rays at the long end of the spectrum had no effect; it was to that region that the rays used in diathermy belonged. With regard to abuses of ultra-violet radiation, he thought these came under three heads; extravagant claims, injudicious doses, and home use To claim cures of cases, unsupported by scientific measurement and accurate clinical data, and based on insufficient numbers, was in his opinion dangerous, misleading, and liable to bring the subject into disrepute. With regard to injudicious dosage, this implied a failure to realize the true needs of the patient. Patients might be classified as those requiring sedative, tonic, and counter-irritant treatment. It was possible to use ultra-violet radiation in a sedative way and also in a counter-irritant way, but the essential preliminary before its use was not only accurate diagnosis of the disease, but a careful assessment of the condition of the patient; and, further, it was necessary to know the lamp, and what was exactly required of it. He thought there was no doubt that ultra-violet radiation could light up a quiescent phthisis, or give rise to cataract, or increase a bacterial infection. In a case of chronic long-standing arthritis of the hip, following a hunting injury, after the patient had made considerable progress with diathermy the speaker thought he would try ultra-violet radiation. The effect was to precipitate a definite and acute attack of appendicitis. With regard to home use, he was not a party to the general condemnation of the lamp at home, nor to its general recommendation. Ultra-violet radiation, which was capable of altering the lime salts of bones in a very short period, of altering the nutritive value of milk in nursing mothers on the one hand, and lighting up phthisis on the other, was a potent therapeutic agent not to be lightly installed in every room. But geographical and other reasons might bring about a set of circumstances in which, after accurate diagnosis and determination of dosage, and instruction — given an intelligent patient — he might be allowed to use the lamp at home. Any employment of the lamp which went beyond those limits he would condemn. If the uses of ultra-violet radiation were not to be outweighed by its abuses it was necessary that the knowledge with regard to it should be on firm grounds and the technique capable of accurate description. Dr. Heald ventured with some hesitation to make one observation—namely, that in his own experience he was finding a curious difference in clinical results obtained, say, with the mercury vapour lamp at a great distance, at a medium distance, and, with the Kromayer or Finsen-Reyn lamp, in close proximity.

Dr. A. C. Roxburgh spoke of the detection of ringworm hairs in the scalp by ultra-violet radiation. The patient was taken into a dark room and placed underneath a mercury vapour-lamp, with the hood closed save for an opening about 2 inches in diameter, across which was a piece of Wood's glass—a dark violet glass containing oxide of nickel. This glass allowed to pass certain of the long ultra-violet rays, from 3,600 to 3,300 Angström units. If the hand were placed under this emission the skin would be seen to fluoresce slightly, and the nails much more. When the head of a child afflicted with small-spored ringworm—which was the common kind of ringworm in this country—was exposed, the normal hairs looked as though they had been slightly dusted with flour, but the

ringworm hairs showed a brilliant greenish light, which enabled one to pick out a single ringworm hair in an otherwise healthy scalp. This method had been found useful in detecting early infections in brothers and sisters of patients obviously infected. It was as well to remember that iodine would completely prevent the fluorescence, and silver nitrate would stop it to a certain extent.

Dr. Leonard Hill, in reply, said that in the measurement of ultra-violet radiation biological methods must be the final standard. To find out the exact dosage for a patient nothing was easier than to put some kind of a bandage on the arm or elsewhere, and expose through small holes in the bandage for different periods. The dose which produced the smallest amount of erythema should be used to start with. For estimating the dosage of the lamps the acetone-blue method was accurate.

Dr. O'Donovan, also in reply, said that any man who would learn to use ultra-violet radiation should go to a clinic and instruct himself in its traditions. These things were only learned by the experience of actually seeing cases handled in the mass.—*Brit. M. J.*, Feb. 18, 1928.

DIATHERMY IN RELATION TO CIRCULATORY DISTURBANCES

ROYAL SOCIETY OF MEDICINE, SECTION OF ELECTRO-THERAPEUTICS, JANUARY 20TH

In dealing with the results of diathermy in disturbances of the cardio-vascular system, Dr. T. F. Cotton said that the value of the treatment depended entirely upon the production of heat within the body; there was general agreement that no other special effect came into play. Lewis had lately advanced the view that the reaction of dilatation of the arterioles, venules, and capillaries to changes of temperature was dual: there was a direct influence of heat evidenced in a lessening of tone of the walls of the small blood vessels, and also an indirect (and predominating) influence of heat in increasing the concentration of vaso-dilator substances in the tissue spaces. This reactive hyperæmia, with increased blood flow, was the mechanism of fine adjustment which governed the nutrition of the tissues. It was probable that the deeper vessels reacted in a manner similar to that of the cutaneous vessels, and, this being the case, diathermy in the treatment of disturbances of the cardio-vascular system had a direct relation to the physiological facts. It followed from this explanation of the mechanism of response of the blood vessels to heat that when constrictor influences predominated and caused alteration in the peripheral circulation, with eventual pathological changes, the release of these vaso-dilator substances, causing the small vessels to dilate, brought about the restoration of the normal circulation and blood supply to the tissues. Diathermy, therefore, seemed to have an appropriate part to play in the treatment of such conditions. Theoretically, also, in such a disturbance as was found in intermittent claudication diathermy should be a valuable remedial agent, and it was true that in many cases there was symptomatic improvement, but others, for some reason, were refractory, and did not benefit. Another condition in which constrictor influences predominated was acrocyanosis, but here diathermy failed to relieve the venous stasis more than temporarily. The treatment, spread over a number of weeks, had not proved sufficient to control the constrictor influences, which might be of central origin. With regard to high blood pressure and its treatment by diathermy, the speaker thought that patients with hypertension might be divided into two main groups—namely, those with symptoms directly due to the high blood pressure, and those with symptoms due to other causes. Patients in the first category were decidedly better when the blood pressure was lowered 20 mm. Hg, or thereabouts, as a result of diathermy. The second group—namely, that of patients with symptoms due to other causes—included those with signs of renal insufficiency predominating, and it was not rational to give them treatment which had as its main object the lowering of the blood pressure. Diathermy should not be given in hypertension with renal disease predominating. The group also included patients with symptoms of myocardial exhaustion due to auricular fibrillation. The blood-pressure level could be affected in these patients by slowing or altering the rate with digitalis, but no good, in his opinion, could come from diathermy. Diathermy, however, might be a valuable therapeutic agent in patients with high blood pressure and symptoms of angina. Dr. Cotton looked upon angina as itself a symptom of myocardial exhaustion, frequently associated with coronary changes; when such patients had high blood pressure, and this was reduced to a lower level or to normal, the heart had probably less work to do and the circulation was more easily maintained. Unfortunately, many such patients did not do well under diathermy, and it might be that the group of patients with angina who did not improve were patients with coronary disease, on account of which the vessels were refractory to heat. There was, however, another type of angina, sometimes called secondary, in which there was no structural disease, but probably a nutritional disturbance of the heart function which might be of toxic origin, and here diathermy was likely to be helpful after any foci of infection had been removed.

Dr. Justina Wilson gave an account of the

symptoms and course of chronic constitutional hypertonia, illustrating it from her experience of various cases. In uncomplicated high blood pressure diathermy might be valuable, and most helpful of all in intermittent claudication, but to be really effectual she thought it should be combined with careful treatment of the lymphatics. Light superficial stroking of the lymphatics of the skin, combined with a thorough vibratory treatment of the deeper lymphatics, was a useful adjuvant. In cases of angina diathermy should be given only with very careful precautions, with treatments certainly not every day, with small amounts of current, and with not over long séances.—*Brit. M. J.*, Jan. 28, 1928.

Abstracts from Current Literature

MEDICINE

Results of Liver Feeding in Pernicious Anæmia. Starr, Paul, *Am. J. M. Sc.*, March, 1928.

The most striking change in the first ten days of liver feeding is the increase in the number of reticulocytes and the rapid decrease in bilirubinæmia.

In the ten cases reported the red blood count reached 4,000,000 in from five to ten weeks, the average time being seven weeks. The amount of liver necessary to produce these results is approximately 200 gm. a day. As has been shown by Minot, it is necessary to continue to take liver indefinitely. Advanced spinal-cord degeneration is not altered by this recovery of the blood. Glossitis and anæmia recurred when liver feeding was discontinued at the end of eleven months, which shows that the essential pathogenic mechanism has not been removed by liver feeding. LILLIAN A. CHASE

Treatment of Diabetes with an Acid-Alcoholic Extract of Plants Rich in Vitamin B. Mills, C. A., *Am. J. M. Sc.*, March, 1928.

Extracts prepared from a mixture of plants by acid-alcoholic extraction was used both orally and subcutaneously on diabetic patients.

Seven cases are reported. The results seem to show a definite lowering of sugar excretion where the vitamin extract is given. Insulin and vitamin show better results than insulin alone; it has the added advantage of oral administration. LILLIAN A. CHASE

Stammering Produced by Thyroid Medication. Gordon, Murray B., *Am. J. M. Sc.*, March, 1928.

The amount of thyroid that can be taken without producing untoward effects depends on the autogenous thyroid content of the individual as well as on his susceptibility, and not on his age or weight. The clinical picture supplies the best information as to the tolerance of any particular patient. The symptoms produced by the administration of thyroid beyond the point of tolerance are crying spells, outbursts of temper, marked irritability, vertigo, headache, diarrhœa, syncope, tachycardia, flushed face, rapid rise in temperature To this list the author adds the symptom of temporary stammering. One of the exciting factors in the etiology of stammering may be nervous excitation. In the cases studied the relationship between the stammering and the administration of thyroid extract was so marked that stammering could be produced at will, an increase in the dosage intensifying the disturbance and a decrease modifying or stopping it. Studies of the thymus were made in each of the five cases reported. No hypertrophy of the thymus at any time was found, nor was there any difference in the size of the thymus between the active and quiescent stages of stammering.

The treatment of childhood myxœdema and hypothyroidism at this clinic consists of starting with a small dose, gradually increasing it every other week at first twice, then three times daily. During the alternate weeks no medication is given. The first dose is 1/10 gr. thyroid extract, the next ⅛ gr., ¼, ½ and so on, until 1 gr. of thyroid extract three times a day is reached. It is continued at this dose adhering to the alternation of one week.

LILLIAN A. CHASE

A New Ultra-Violet Ray Transmitting Glass. English, S., *Brit. J. Actinotherapy*, April, 1928, iii, 13.

The author, working partly in the laboratories of the department of glass technology of the University of Sheffield, and partly in the research department of Holophane Limited, of Westminster, has devised an improved ultra-violet ray transmitting glass, which is now being produced by Holophane Limited, of Elverton Street, Westminster. In this research he followed the lead of a famous continental firm of optical glass manufacturers, who had produced an optical glass with good ultra-violet transmission. It is reported that when this particular brand of glass was used in a telescope for stellar photography the number of stars registered on a photographic plate was very materially increased.

Acting on hints thus obtained, the author has invented a new glass which is being marketed

under the name of *holviglass*. Tests have proved that *holviglass* freely transmits the whole of the rays found in the sun's spectrum; indeed, the 15-ounce glass is transparent to rays as short as 2590 A.U.; whereas the sun's spectrum ends between 2930 and 2950 A.U. The new glass is extraordinarily transparent to rays in the zone of physiological efficacy. A. G. NICHOLLS

PÆDIATRICS

Enuresis. Calvin, J. K., *J. Am. M. Ass.*, March 17, 1928.

Most cases date from infancy but a few develop after illness or unusual excitement—the nocturnal type being much more prevalent than the diurnal. Numerous automatic causes are cited which can be located on examination and dealt with. Heredity cannot be left out altogether. The main divisions as regards etiology are: (1) Organic or physical disturbances and irritation of mechanical or constitutional origin. (2) Bad habit formation or lack of training in an unstable nervous system. The author is especially interested in the second group. Most of these cases show other symptoms of general disturbance of the vasomotor system. The author is very emphatic that a careful physical examination should always be made.

Training of infants should begin at 6 or 7 months. Day training can be started at 14 months and then by cutting off fluids after 5 p.m., letting the child urinate at bedtime and 10 p.m. the night training follows. Many cases develop because training is left too late. Also any manner of trying to put pressure on the child, such as whipping, shaming and so on, only makes things worse. The child should be encouraged and rewarded when possible.

Treatment lies in general improvement of tone, training as indicated above, and the prevention or removal of whatever is exciting or upsetting late in the day. The author says that he has had great success in the use of a sedative such as phenobarbital given at bedtime in large doses—the drug is continued for two weeks and then gradually dropped. Removing the child to a new environment often succeeds in a surprising way.

Generally speaking, a casual, indifferent attitude towards the habit is most helpful.

P. M. MACDONNELL

Parental Blood Serum in Measles Control. Bivings, F. Lee, and Dickson, Roger W., *Arch. Pæd.*, Oct., 1927.

The value of blood serum from convalescent measles patients in the protection of exposed persons is fairly well established. Such a procedure is feasible in hospitals for infectious diseases. Elsewhere, it is difficult to obtain a suitable serum. The authors have, during the past two years, been testing the efficacy of the serum obtained from adults who have had measles at some time. In most cases, they have used the blood of one of the parents, as they were usually willing donors for their children and a Wassermann test was not considered necessary.

The technique used was as follows: Blood was withdrawn from the donor into a large glass syringe and immediately expelled into a 60 c.c. glass ampoule capped at either end with a rubber cap. The ampoule was shaken and put away in a cool place for 12 to 24 hours. At the end of this time, the blood clot had floated clear and the serum was withdrawn by syringe without disturbing the clot. The serum was injected subcutaneously between the scapulæ. No local or general reaction was noted.

The authors treated a group of twenty-three children who had been exposed to measles. This was given within four days after exposure. The children varied in age from 7 months to fourteen years. Of these children, thirteen were completely protected from the disease and ten had a modified type of the disease in a very mild form. The dose of serum varied from 6 c.c. to 25 c.c. according to the age of the patient. The authors feel that the ideal to be aimed at is to attenuate the disease with a resulting permanent immunity, rather than to provide a complete but temporary protection.

S. G. Ross

SURGERY

The Use of Lugol's Solution in Exophthalmic Goitre. DeCourcy, Joseph L., *Ann. Surg.*, December, 1927.

The pre-operative administration of Lugol's solution in cases of exophthalmic goitre lowers the basal metabolic rate, controls the toxic symptoms and lessens the hazards of operation. Opinions as to the way in which iodine medication benefits the patient are not unanimous. The toxic symptoms are evidently associated with iodine starvation of the thyroid acini and it is reasonable to assume that iodine acts by detoxicating an incompletely iodized thyroxin molecule.

The author, in removing hyperplastic thyroid glands of patients previously subjected to iodine medication, has repeatedly observed that the glands are very œdematous. This condition is not true of hyperplastic glands without iodine treatment, nor of ordinary colloid goitre.

This leads him to believe that the beneficial use of Lugol's solution is brought about by a rapid formation of colloid material, resulting in back pressure on the secreting cells and the thin-walled veins surrounding the acini. Hence passive œdema follows and the cells, tem-

XUM

porarily inactive, fail to absorb the toxic substance; hence the patient's clinical improvement. He believes that, in the course of time, new blood vessels are formed and the older ones accommodate themselves to the new conditions, so that absorption is resumed, notwithstanding the fact that the colloid material may persist in the acini.

This hypothesis would account for the fact that improvement resulting from an iodine medication is only temporary, which is in accord with Marine's views, based on experimental observation on animals, and consistent with changes found in thyroid glands, which are removed after preliminary treatment with Lugol's solution. R. V. B. SHIER

Chronic Post-Operative Tetany. Jackson, A. S., *Ann. Surg.*, Dec., 1927.

Discussions of successful results following the operation for thyroidectomy often have a tendency to minimize the complications. The author points out that the problem of post-operative tetany is a serious one. It was particularly serious in the clinics of Billroth and Kocher and resulted in a high mortality, but, as surgeons became better acquainted with the condition and more conservative in their methods, the operation of simple lobectomy gained in favour. This latter operation often resulted in incomplete cure or recurrence, which led in time to the operation of resection being suggested, so that nowadays, in order to obtain freedom from recurrence, it has been found necessary to remove all but a small portion of the gland.

The parathyroids vary in number and situation, but are usually situated in pairs along the posterior surface of the thyroid. They may appear singly or in groups They have a close relationship to the superior and inferior thyroid arteries, receiving their principal blood supply from the latter.

In 1918, Howland and Marriott determined that the blood calcium in the serum of normal persons varies between 9.2 and 11.3 mg. for each 100 c.c. of serum. In patients suffering from tetany this calcium content is reduced to an average of 5.6 mg. for each 100 c.c. and they believed that convulsions developed if the blood calcium content became less than 7.0 mg. for each 100 c.c. This work has proved of great practical value and now governs our present day therapy.

In 1924, Collip found a parathyroid hormone which will prevent or control parathyroid tetany and regulate the blood calcium level.

Surgeons are generally agreed that, in order to cure exophthalmic goitre, only a small portion of gland must be left. In performing thyroidectomy it is important to protect the recurrent laryngeal nerves, the parathyroid glands, and the trachea, and yet remove sufficient thyroid gland to effect a cure. With this tendency to remove more and more tissue, there appears to have been an increase in the incidence of tetany. In operating one must endeavour to preserve the small parathyroid bodies by avoiding them rather than seeking them. Tetany is not always the result of direct injury to the glands, but rather to a cutting off of the blood supply either through ligation of the vessels, or from œdema and scar tissue.

The clinical signs of tetany comprise Trousseau's sign of induction of spasms between attacks by exerting pressure over the main nerve trunk of the forearm, and Chvostek's sign in which gentle tapping along the course of the facial nerve produces a twitch in the muscles of the mouth and alæ nasi. The only other sign of value is that of determining the calcium content of the blood.

With regard to treatment the author states that in his cases he has found marked benefit by giving calcium lactate by mouth in doses of 120 grains each at one-hour intervals. In case the symptoms do not subside, he gives three additional doses. The further treatment of the case is managed in accordance with the laboratory data. In the mild cases these doses are sufficient to tide the patient over the period of temporary hypoparathyroidism.

Ten c.c. of a 5 per cent solution of calcium lactate given in 100 c.c. of sodium chloride solution gives immediate relief in the more severe forms of tetany. In these transient acute cases one intravenous treatment will usually suffice. Calcium lactate may also be given by mouth or by rectum.

The cases of acute tetany coming on shortly after operation need cause little concern, the real problem being what to do in the case of chronic tetany. In many of these cases, as long as calcium lactate is given orally, the condition is controlled. Transplantation of the parathyroid glands has proved unsatisfactory, but, in Collip's parathyroid hormone, we have a most valuable remedy in restoring temporarily the normal blood calcium.

The author advises that patients suffering from chronic tetany should receive a maximum of sunlight, and ultra-violet light may be used with great advantage. A diet of high calcium content is important. This includes milk, peas, beans, eggs, and sauerkraut. It is particularly important to avoid meat as was shown by Rosenbloom in his investigations. It is also important to prevent constipation. R. V. B. SHIER

Hexylresorcinol as a General Antiseptic. Leonard, V., and Feirer, W. A., *Surg, Gynec. & Obst.*, Nov., 1927, xlv, 5.

This paper embodies researches in regard to tissue surface disinfectants. The failure of most

germicides has been found to be due to their lack of some one or other of the properties which should be possessed by the ideal disinfectant. The qualities required are these: the substance should be chemically stable, non-toxic, and non-irritating; it should be rapidly bactericidal in high dilutions, highly penetrating, and unaffected by organic matter. As less essential qualifications, it should not stain, and it should be free from objectionable odour.

In the search for a substance of this nature, the alkyl resorcinols have been chosen as complying most closely with the requirements. This group of compounds belongs to the phenols and comprises some of the most powerful germicides known. One of the most striking features of the alkyl resorcinols is that whilst in other substances as a rule increased toxicity presupposes an increase in irritant properties, there is in this case an actual lessening of irritant qualities along with an increase in germicidal strength. Hexylresorcinol, for example, which is derived from resorcinol, shows an increase in germicidal power over its mother substance, of more than 20,000 per cent, and yet is not any more irritant or toxic.

In more detail, it is found that this is a stable chemical compound. Aqueous solutions retain their bactericidal activity after months of standing at room temperature. It is non-toxic, and even large doses (0.6 grm. three times a day) have produced no untoward effects. It is completely free of irritant qualities in dilutions which are highly bactericidal.

Some difficulty was experienced in finding a suitable medium in which it could be used as a general antiseptic, since it is only slightly soluble in water. Finally, however, the best solvent was found to be glycerine, and this in the proportion of 30 per cent with 70 per cent of water, was found to hold it in perfect solution in all dilutions. The solution is as clear as water and does not attack any of the heavy metals.

There seems to be no doubt that this substance (designated as "Solution S.T.37") possesses extremely powerful bactericidal qualities, and these with its capacity for penetration into the minute crevices of the skin (due to its low surface tension) give it a high place among disinfectants. It may be used in full strength on the skin, on granulating surfaces and in abscess cavities and sinuses, and may be diluted as required for such purposes as urethral instillations, etc. H. E. MACDERMOT

Ligation of the Angular Vein in Infections of the Upper Lip. Roeder, C. A., *J. Am. M. Ass.*, Jan., 1928, xc, No. 4.

After commenting on the serious prognosis which attends infections of the upper lip, Dr. Roeder briefly reviews the anatomical disposition of the venous channels of the face, and shows why infections in this situation are so apt to lead to thrombosis of the cavernous sinus and meningitis. The main channel of communication between the tissues of the face and lips is through the angular vein along the side of the nasal bridge into the orbit where there is an anastomosis with the ophthalmic veins, which in turn lead backwards into the cavernous sinus. Other veins lead from the deep pterygoid region to the cavernous sinus, but this pathway while it is connected with the region of the upper lip is much less direct than the route by way of the angular vein.

With these facts in mind, he suggests that ligation of the angular vein may be of value in blocking the most likely route by which infection from superficial areas on the face will travel into the cranial cavity. He gives details of a case of carbuncle of the upper lip in which he carried out this procedure. The infection of the lip was well established and the left angular vein showed marked engorgement. The vein was tied off a little below the inner canthus, and treatment of the carbuncle was completed with the electric cautery. Recovery was uninterrupted. H. E. MACDERMOT

OBSTETRICS

Contributions to the Etiology of Pyelitis in Pregnancy. Hofbauer, J., *Johns Hopkins Hosp. Bull.*, March, 1928, xlvii, 3.

Dr. Hofbauer shows that our knowledge of the clinical aspects of pyelitis in pregnancy is more advanced than is our knowledge of what causes the pyelitis. On reviewing the literature he was particularly struck with the disagreement of opinion regarding the pathological changes which accompany the condition and his researches were therefore based on the study of specimens obtained from pregnant women. This was supplemented by a number of pyelograms taken during various stages of pregnancy. He has also contributed some observations on the after effects of pyelitis, with some suggestions as to treatment.

The evidence he has collected goes to show that during pregnancy definite hypertrophic changes occur in the structure of the trigone of the bladder, and also in the adjoining part of the ureter. There is a concentric hypertrophy not only of the ureteral wall but also of its sheath, and since these changes are most marked at the junction of the ureter with the bladder the possibility of stenosis of the ureter is greatly increased. Added to these changes there occurs an angulation of the right ureter at its junction with the bladder, as a result of the frequent dextrorotation of the pregnant uterus, together with a stretching of the left ureter. Dr. Hof-

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bauer regards this latter factor as of more importance than the congestion and œdema of the mucosa.

The distensibility of the ureter, especially in its lower part, also becomes affected during pregnancy. This is because of the increase of connective-tissue elements in its wall, a fibrous hypertrophy which occurs between the muscle bundles. Consequently, the ureter in this region becomes more or less unyielding. These changes, however, do not appear in the upper portion of the tube to the same extent; so that the tube in this region retains its flaccidity and allows of dilatation. Evidence is also given to show that involution of the ureteral wall occurs just as it does in the uterus, but if there has been a pyelitis and distension of the ureter, there is likely to be a persistence of the bacteria in the walls, and a chronic dilatation of the ureter in its upper portion. In repeated infections stricture of the lower part of the ureter may result.

It is on such anatomical and pathological grounds, therefore, that the explanation of ureteral dilatation seems most plausibly explained.

Dr. Hofbauer's histological studies showed a similar hypertrophy of the muscular and elastic tissues forming the trigone of the bladder. Here again there develops an element of possible obstruction to the outflow of urine from the bladder which accounts for the clinical phenomenon of residual urine in pregnancy.

The present methods of treatment are admittedly inadequate. In view therefore of these structural changes in the ureteral walls it is suggested that pituitary extract be used. Both experimental and clinical observations show that it relieves congestion and stimulates ureteric peristalsis. Its use, therefore, for a short time after pregnancy, is recommended for restoring the normal shape and efficiency of the ureters.

H. E. MACDERMOT

Obituaries

Dr. William Grant Stewart died on April 21st at his residence in Montreal. A son of the late Rev. James Stewart, Presbyterian minister in Oro, Ontario, he was born in 1860 and received his early education in the public schools of Ontario, and after passing through them he entered the Faculty of Arts, McGill University, from which he graduated in 1885, winning the Logan Gold Medal. Continuing his course in the Faculty of Medicine he won the final prize in his last medical year, as the best man in the graduating class of 1888. After spending a year as an interne in the Montreal General Hospital, he went abroad and took post-graduate work in Berlin, London and Edinburgh. Returning to Montreal in 1890, he began private practice, and for upwards of thirty years, until his health began to fail, Dr. Stewart was a most enthusiastic and successful practitioner of medicine. He was a lecturer in Clinical Medicine in the University of Bishop's College, where he taught for several years.

Early in his career he was appointed physician to the Western Hospital, a position which he held until 1921.

Not only was he interested in private practice and the Medical School, but he found time to give to several charitable institutions, serving as physician and sitting on their Boards,—to mention but two, the Montreal Maternity and the Alexandra Hospital. He was chosen President of the Medico-Chirurgical Society in 1919. He was a very active and interested member of the St. James Literary Society and an original member of the University Club.

In 1924 failing strength compelled him to withdraw somewhat from his accustomed activity, yet during the greater part of the four years preceding his death Dr. Stewart retained in a remarkable degree his interest in medicine, in his books and in his friends. He will long be remembered for those qualities of mind and spirit which were always so clearly shown in his life of devotion to his profession, in his high idealism, his simple faith, his sympathy and his broad-mindedness.

He is survived by his wife who is the daughter of the late David Macfarlane.

W. F. HAMILTON

AN APPRECIATION

Dr. Grant Stewart passed away during the month of April at the age of sixty-eight years, after forty years of practice in Montreal. It was not a life prematurely severed—his was not a career cut short before performance was possible, but his life was drained to the last drop, and drained in service to his fellow-men.

Beginning his career as a general practitioner, he early acquired a special knowledge of obstetrics and

Dr. Grant Stewart

clinical medicine, in recognition of which he was appointed as Lecturer in Medicine at Bishop's College and Attending Physician to the Western Hospital. Conscientious in his work, kindly of heart, unselfish in service, honourable in all his dealings, it was little wonder that Stewart soon acquired a large and absorbing practice, one which in the course of time imposed shackles which were too heavy to carry, until the burden wore him down. Driving the human machine day and night, year in and year out, never refusing a call for

help, especially among the poor and weak, it was but natural that somewhere the engine would cease to function normally; and so it happened a few years ago after a strenuous week of service when, as he said, the mere sight of a long stairway made him hesitate, his heart reacted to the strain. Cardiac weakness declared itself, and the first grave warning appeared. Following a prolonged rest, he again undertook a limited amount of practice, and during several years, participated in the contact with human beings which was the great motive of his life. His last appearance in public was at the official luncheon to his friend Sir Wilfrid Grenfell, and prior to that he addressed the medical students of McGill, presenting each with a copy of his favourite address, Sir William Osler's "Way of Life."

Stewart indulged little in outdoor sport, though he was never unsympathetic with athletic achievement. His main interest, apart from his practice and his home, was in the quieter enjoyment of music, literature, and the contacts with his many intimate friends.

To his colleagues, Stewart had a personal charm that attaches to one so earnest and sincere in his devotion to duty. Books were, perhaps, the greatest of his joys and recreations, and one can picture those happy hours of reading aloud in his home, where in the happy companionship of a devoted wife, many an hour was spent in perusal of the best there was in literature. He had a flair for selecting passages dealing with the humanities—most fond, perhaps of the works of Osler and Holmes, but his frequent quotations from poets and divines illustrated the quality of his taste and the breadth of his interest. It was a pathetic moment, during the last days of his illness, when the first serious discouragement arose—for as he said, "Things must be pretty bad. My desire for reading is gone."

Travel, too, was a joy to him, and while, for the most part, his trips would lead to medical centres, yet there were times when he abandoned himself to the simpler enjoyment of jaunts to his friends in England and the playgrounds of Europe. Serious as was his work to him, he possessed a pawky humour and could always appreciate the comical side.

His memory will remain green and vivid with us when others, perhaps more brilliant, are languishing in the shade. His was a noble and blessed life—none more enviable. There was an unconscious sanctity about him, as vital to him as his breath, and if ever a halo surrounded a saint, it certainly encompassed Stewart, a man who carried his shrine everywhere with him in the midst of a veritable whirl of active practice.

He has bequeathed a pure standard of life, a record of lofty ambition for the public good, a monument of lifelong labour.

The crowded church on the occasion of his funeral was a fitting testimonial to his life's work and to the affectionate regard of his friends and patients.

We share with his relatives the pride they may justly feel in a life that leaves no regrets other than the sad loss of a companionship and a friend that cannot easily be replaced. Every physician who knew him will burn incense before his memory.

CHARLES F. MARTIN

Dr. Allan Adams. The sudden death of Dr. Allan Adams, B.A., '01; M.B., '04; on January 14th, came as a great shock to his many friends and associates. Dr. Adams was the only son of Dr. and Mrs. Wellington Adams of Whitby, Ontario. He received his early education and matriculated from the Collegiate Institute in that town.

In 1897 he registered in the Faculty of Arts at University College, Toronto, taking an honour course in Natural Sciences, and later on entered the Faculty of Medicine from which he graduated in 1904. After graduation he spent a year at the Toronto General Hospital as house surgeon, after which he went to Gravenhurst, and was attached to the staff at the Ontario Hospital for Consumptives. Later, he was appointed physician in charge of the Hospital for Consumptives at Weston. In 1909 Dr. Adams opened an office in Toronto, as a general practitioner, but he never lost his interest in diseases of the chest and was for many years Secretary of the Laennec Society of Ontario.

He was a very active and enthusiastic member of the Kiwanis Club, the Arts and Letters Club and the Alpine Club of Canada. He was an ardent gardener, paying particular attention to the culture of gladioli. His garden at his summer home at Port Bolster was widely known throughout the district for its profusion and variety of colour and attracted lovers of flowers and beauty from distant parts of the province.

Dr. Adams was an active member of St. Peter's Anglican Church, in which he served as People's Warden for many years. Surviving him are five children and his wife, formerly Leonora Palmer of Gravenhurst whom he married in 1925.

Dr. Harold S. Clark, of Saint John, died at the Saint John Infirmary on April 2nd, following an operation for a perforated gastric ulcer. Dr. Clark was the son of the late Captain Thomas Clark. He was educated at St. Peter's School, St. John High School, St. Joseph's University and McGill University, graduating from McGill in 1917. He was for a time Acting-Superintendent for the St. John County Hospital. Dr. Clark enjoyed a large practice in Saint John. He was a keen supporter of all forms of amateur sport.

Dr. Geo. A. Dickinson, the medical officer of health of Port Hope, died on April 18th.

Dr. George Stanislas Gregoire, who for years represented the County of Frontenac at the Legislative Assembly, passed away at his home in Sherbrooke on April 6th, after a six months' illness. Dr. Gregoire was born in Restigouche, County of Bonaventure in 1845 and was educated at the Seminary of Quebec and at Laval University, and was well known and highly respected in the community in which he lived.

Dr. Walter Hamilton, one of the oldest of Toronto's practitioners, died on April 17th. A graduate of the Toronto School in 1889, Dr. Hamilton was a man of many interests; he was particularly well known as a linguist, and with a few of his confréres had kept up the study of French and German, both of which languages he spoke fluently.

Dr. M. A. McQuade, a Canadian and a graduate of Toronto University, died suddenly in Newburgh, N.Y., as the result of a cerebral hæmorrhage. After graduating from the university he spent a few years in general practice in Canada. He then went to Europe and studied both in London and Vienna, with the intention of limiting his practice to ophthalmology. On his return to America he practised in Newburgh in the State of New York and soon developed a large practice. He was very fond of children. A large portion of his practice was charitable.

Dr. William Donald Rankin. On March 31st the death occurred of Dr. Rankin, aged sixty-two years, at his home in Woodstock. His death came unexpectedly, as he had attended a meeting of the Council of the College of Physicians and Surgeons at Saint John a day or two previously.

Dr. Rankin was born December 8, 1865, at Greenbank, New Brunswick, and pursued his education at the Woodstock Grammar School, and the University of New Brunswick, where he received his B.A. in 1886 with honours in Science. He studied medicine at

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Edinburgh University and received his B.M. in 1890. He continued post-graduate studies at Guy's Hospital and St. Bartholomew's Hospital, London. On his return to Canada he practised in Woodstock, where he has long been a leader in medicine, especially in its surgical branches. Much of the success of the Fisher Memorial Hospital is due to the efforts of Dr. Rankin.

He was a charter member of the American College of Surgeons, a member of the New Brunswick Council of Physicians and Surgeons, a member of the Medical Council of Canada, Senior Surgeon of the Fisher Memorial Hospital at Woodstock, a member of the Senate of the University of New Brunswick, a local representative of the D.S.C.R., besides holding a number of other offices of a purely civic nature in his home town.

Dr. Rankin's death will be a loss both to the profession in Woodstock and throughout New Brunswick. His presence at medical meetings was regular and his counsel was always sound.

Dr. Struthers, for many years associated with the Workmen's Compensation Board, died in Toronto on April 20th.

News Items

GREAT BRITAIN

The annual report of the British Empire Leprosy Relief Association seems to indicate that material progress is now possible in the matter of controlling this dread disease. Leprosy, however, is more prevalent than has been thought. The first estimate, of 250,000 cases in the British Empire as a whole, was too low. A special survey has revealed the fact that there are more than 500,000 cases in India alone.

Sir Leonard Rogers, the honorary medical secretary, in speaking to the report, stated that there was the most complete evidence that the early cases of leprosy could be cured. Authorities in Calcutta and the Philippines were agreed on this.

The latest remedy is sodium hydnocarpate, derived from hydnocarpus oil, which is exceedingly cheap, less than sixty cents per year for each case. Several thousand hydnocarpus plants had been grown from seed sent out by the Association, and it was hoped that in a few years every British possession afflicted with leprosy would have its own supply of the remedy. This, with the detection of early cases, meant that about 80 per cent of cases could be cured in the early stages.

The Medical Society of London has a long and honourable history, dating back to 1773. Its library contains one of the finest collections of manuscripts and old historical works in the world. One of their treasures was the manuscript of the common-place book of the Rev. John Ward, vicar of Stratford-on-Avon and also a medical man, who wrote his diary about forty years after Shakespeare's death. Among other references to Shakespeare's life it is stated in the diary that out of the proceeds of his plays "Shakespeare spent at the rate of £1,000 a year," and that after a merry meeting with Ben Jonson and Drayton, "at which it seems he drank too much, he died of a feavour there contracted." It had been hoped that this valuable manuscript, which for interest has been compared with the work of Pepys, would remain in the country. Unfortunately, this is not the case, for it has been purchased at a very handsome price by an American collector and will cross the water.

The scheme of the British Red Cross to establish clinics for the diagnosis and treatment of rheumatic affections is starting out well. The first clinic is to be established in London. The King has shown his approval by sending a cheque for £100 towards the fund of £40,000 which it is hoped to raise. The Queen has sent £50, and Princess Victoria £10.

It is hoped that an acceptable compromise will be reached on the subject of the proposed exclusion of women students from the medical schools of most of the London hospitals. . . . Though final decisions have still to be taken by certain hospitals, the intention of King's College, Charing Cross, and Westminster Hospitals is believed to tend towards the exclusion of women medical students, and if these hospitals take that step there will only remain the Royal Free Hospital and University College Hospital (with a maximum of 12) still open to women. It is only since the days when, owing to the absorption of men by the War, male students fell off in numbers that women have been admitted to any of the London hospital medical schools other than that of the Royal Free Hospital, where the students are exclusively women. Some of the hospitals, including Guy's, St. Bartholomew's, and St. Thomas's, have never admitted women students. For forty years the Royal Free Hospital alone accepted women. In the middle of the War St. Mary's Hospital was the first of the men's schools to take women for co-education. After that women were admitted at the London, Charing Cross, King's College, Westminster, and University College Hospitals, but since the War the London Hospital has resumed its male exclusiveness, and the others, with the exception of University College, are about to do the same. At present it is estimated that there are about six hundred women medical students in London, and that about half of them are attached to the Royal Free Hospital.—*The Times Weekly Edition*, March 29, 1928.

The Council of the Royal Society of Arts gives notice that the next award of the Swiney Prize will take place on January, 1929, the 85th anniversary of the testator's death, to the author of the best published work on Medical Jurisprudence. The prize is a cup of the value of one hundred pounds and money to the same amount. The award is made jointly by the Royal Society of Arts and the Royal College of Physicians. On the last occasion of the award in 1924 the prize was awarded for General Jurisprudence. It will therefore be offered on the present occasion for a work on Medical Jurisprudence. Any person desiring to submit a work in competition, or to recommend any work for the consideration of the judges, should do so by letter addressed to the secretary of the society, John Street, Adelphi, London, W.C.2, not later than November 30, 1928.

GENERAL

Sixth Conference of the International Union Against Tuberculosis

The Executive Committee of the International Union against Tuberculosis held a meeting on Thursday, January 26th, at 4 p.m., at the Secretariat of the Union, 2, Avenue Vélasquez, Paris, under the chairmanship of Professor Paolucci. The main subject on the agenda was the provisional programme of the VIth Conference of the International Union to be held in Rome from September 24 to September 29, 1928, under the patronage of the National Italian Fascist Federation for the campaign against tuberculosis. The following persons have been selected to read the opening report on each of the three questions entered on the agenda: (1) Biological subject: "Filterable elements of the tubercle virus," opening report by Professor Calmette of the Pasteur Institute, Paris; (2) Clinical subject: "Diagnosis of tuberculosis in children," opening report of Professor Rocco Jemma of the University of Naples; (3) Social subject: "Anti-tuberculosis organization in rural districts," opening report by Dr. William Brand, Medical Commissioner to the National British Association for the prevention of tuberculosis. Following the discussion of the three main subjects, lectures will be given during the conference on the following subjects: The Surgical Treatment of Pulmonary Tuberculosis; Social Insurance against Tuberculosis in Italy; Anti-tuberculosis Organization in Milanese Factories. These lectures will not be followed by any discussion. Facilities will be granted after September 15th to visit the leading anti-tuberculosis centres in Italy.

Honorary members, councillors and ordinary members of the union will receive a copy of the proceedings free of charge. Persons not belonging to the union may be admitted as members of the conference on the recommendation of their governments or of their national associations. Any persons who wish to become members must accordingly apply to their government or national association first. These alone are qualified to forward applications to the organization committee. Canadian members should write and make arrangements with the Secretary of the Canadian Tuberculosis Association, Plaza Building, Ottawa. The subscription entitling attendance as members of the conference is 100 liras. This fee includes the price of a copy of the Proceedings.

Leysin, the world-famous health resort, is situated near the Lake of Geneva, on a side line from Aigle on the main Paris-Lausanne-Simplon-Milan route. One of the institutions there, that strikes one as unique, is the University Sanatorium. Dr. Louis Vauthier, of Leysin, a man of vision and practical commonsense, struck with the financial and other difficulties which beset students afflicted with tuberculosis, determined to found a sanatorium where professors and students could be admitted at the lowest possible cost, and be helped to continue their studies in so far as their health permitted. In this way these particular unfortunates would be placed in more helpful and congenial surroundings.

The scheme was approved by the six Swiss universities. The professors and students contribute respectively 20 and 10 Swiss francs per annum towards the upkeep of the institution. Any matriculated member can be admitted without charge, on a medical recommendation, for three months, paying later six francs fifty centimes daily. The scheme has worked admirably. Lectures are kept up with the help of visiting professors of all faculties.

The sanatorium now provides fifty beds. The plan is ambitious, for it is hoped in time to make its scope international, thus broadening the outlook and promoting at the same time international friendship.

We note that at a general conference of manufacturers and distributors of clinical thermometers it was proposed to establish a commercial standard for all clinical thermometers, and by this means to force the marketing of only accurate and reliable articles. Each thermometer must be certified by the manufacturer to comply in all respects to the requirements and tests of the standard adopted.

The fifth international Medical Congress on Industrial Accidents and Occupational Diseases will be held September 2nd to 8th, 1928, in Buda-Pesth, Hungary. Very extensive plans for scientific, social and scenic attractions in connection with the congress are announced. Physicians interested should communicate promptly with Dr. Richard Kovacs, secretary, 223 East 68th Street, New York, from whom all further information regarding the congress can be obtained.

At a recent meeting of the Board of Directors of the Desert Sanatorium of Southern Arizona a quarter of a million dollars was voted to establish an institute of research which will devote its activities to the study of the nature of solar radiations and their effect on living matter.

The brain is the seat of thought, and, that being so, we expect to find in that organ, in its weight, its proportions, and the perfection of its contours, the reasons for the intellectual superiority of man as compared with other organized beings.

An autopsy was performed on the body of Anatole France, easily the most distinguished of contemporary French literateurs, by Drs. Guillaume Louis and Dubreuil Chambardel of Tours. It is remarkable that the brain of the immortal author of Thaïs weighed only 1017 grammes. Another of his compatriots, renowned in other directions, Gambetta, had a small brain also, weighing 1160 grammes. Compare these figures with those found in other cases, namely, the brains of Schubert (1420), Lord Byron (1807), and Cuvier (1829). Although it is a commonplace to state that the cranial capacity of man is greatly larger than that of his nearest congeners, the anthropoid apes, it is not always remembered that very great differences may exist, in this particular, not only between different races of mankind, but even in the same race. The largest brain on record, as well as the smallest, was that of an idiot. Mere size, then, means but little. Apparently what counts is the amount of gray matter, and this depends on the convolutions. In the case of France, the convolutions were long, sharply delimited, closely packed together, and more than ordinarily complex.

It is with much regret that the many friends of Dr. Murray MacLaren, M.P. for Saint John, will learn that he is in the Ottawa Civic Hospital suffering from the effects of a recent injury which has proved more serious than was thought at the time. About ten days ago he was knocked over by a motor car and severely shaken up, but proceeded to the House of Commons. An x-ray examination, however, has disclosed the presence of a slight fracture both of the leg and of the arm.

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NOVA SCOTIA

Very general regret is being expressed in this province over the continued illness of Dr. W. H. Hattie at his home in Dartmouth. The readers of the *Journal* will miss his many contributions to its columns which were always very acceptably presented. The Halifax Branch of the Medical Society of Nova Scotia at its recent meeting instructed the Secretary to convey to Dr. Hattie the best wishes of the Society for his very early recovery. In this the entire profession will heartily join.

Dr. R. G. MacLellan of Lunenburg has been on the sick list for several weeks and probably will be compelled to take a considerable rest before he can resume his extensive practice.

The three post-graduate lecture meetings held in April in Middleton, New Glasgow and Sydney were very successful. It had been intended to hold only two of these meetings, *viz.*, in Halifax and Sydney. The Valley Society, knowing they were going to miss the annual meeting this year, felt that they should have this meeting. The doctors in New Glasgow were insistent that they should meet a former Nova Scotian, Dr. D. S. McKay, one of the speakers. The meeting for Halifax was cancelled and these two were held instead.

All three meetings were most successful, although the state of the roads made it difficult for doctors from the country districts to attend. Dr. McKay enjoyed his trip, as it was coming back home, and Dr. Adamson enjoyed it, on account of the many friends he made while here. Dr. McKay spent several days with his mother at Reserve and was tendered several receptions by his old friends and friends of his father, the late Hon. William McKay, one of Cape Breton's most popular medical men. After the meeting in Sydney, the largest held there for some time, Dr. Adamson went to New York to sail for England, where he will spend several months. All the speakers in this extra-mural post-graduate course in Nova Scotia have been very highly appreciated; all of them will be cordially welcomed should they come again, but none of them will be more cordially received than Drs. Adamson and McKay of Winnipeg, Manitoba.

Very considerable attention has been given recently by the members of the profession in Nova Scotia to the campaign carried on by the Nova Scotia Tuberculosis Commission. These activities have been sponsored by the Canadian Anti-Tuberculosis Society, through the Canadian Tuberculosis Education Committee for the Maritime Provinces. There has, however, been a feeling that the profession had not been fully consulted. This resulted from the fact that the medical members of the Commission and the medical advisory members to the Commission had no means of reaching the various members of the medical societies in the province. When these medical men presented a carefully thought out programme, and gave the proper publicity to it, the profession throughout the province at once responded very favourably. All branch societies are being solicited to give express approval to this campaign.

The Halifax Medical Society devoted an entire evening to the consideration of the proposed campaign of the Nova Scotia Tuberculosis Commission. Dr. W. D. Forrest, of Halifax, presented a very valuable paper on the history of campaigns against tuberculosis. While this brought out very clearly, what has been the truth in many other lines of endeavour, that we, from time to time, place undue emphasis upon certain features of our prevention campaigns, yet we are always reaching forward, and it behooves us to lend every effort to the endeavour that promises us the best results at the time. Dr. A. F. Miller, of the Nova Scotia Sanatorium, brought this out very clearly in opening the discussion on Dr. Forrest's paper. The discussion was very general and the two main principal speakers were presented with the thanks of the Society. The proposed programme of the Commission is being presented to all the branches of the provincial society for their individual approval.

By the time the *Journal* is published for May the examinations at the Medical College of Dalhousie will be completed. Some twenty-five students hope to secure permission of the Provincial Medical Board to practise in this province. We are glad to notice that this year the class is almost entirely made up of young men and women from the Maritime Provinces. Among the undergraduates in other years we note several students from the Dominion of Newfoundland, although we believe there are none this year in the graduating class. Dalhousie is the logical school for the Maritime Provinces and Newfoundland.

It may interest readers of the *Journal* over Canada to know that Dalhousie observes this year its golden anniversary. Sixty years ago its doors were opened to medicals and the graduates propose to make some recognition of the founders of the institution on the occasion of the 75th anniversary meeting of the Medical Society of Nova Scotia early in the coming autumn. The Halifax Medical Society is sponsoring the suggestion for which plans are now well under way.

The *Bulletin*, the official organ of the Medical Society of Nova Scotia, has devoted considerable space in every issue, since last January, to giving prominence to the coming meeting of the Canadian Medical Association in Charlottetown. Besides giving space on its pages for readers and editorials the *Bulletin* was sent to all the practitioners of New Brunswick, Prince Edward Island and Newfoundland. The Publicity Committee and the Canadian Medical Association Council have intimated their willingness to refund the *Bulletin* the additional cost for these special numbers. As there is a feeling that this might be regarded by the Prince Edward Island men as a kindly effort on the part of Nova Scotia to help in making the meeting a big success, the *Bulletin* proposes to continue this publicity until the June number is issued. It is confidently expected that the attendance of Maritime men at this meeting will be the largest yet at any meeting of the Canadian body in this most eastern part of the Dominion. All the Maritime men are pleased that the Prince Edward Island men have undertaken this meeting and, if our attendance, will aid in its success, we expect to be there in full force.

Dr. H. R. Corbett, Dalhousie, 1923, has been recently appointed Roentgenologist to the Nova Scotia Sanatorium, beginning his duties there on March 1st. His many friends are glad to welcome him back to Nova Scotia.

On March 8, 1928, Dr. W. McK. McLeod of Sydney observed the 53rd anniversary of his graduation from Bellevue Hospital Medical College. He is now engaged

in preparing an article on the founding and growth of the Medical Society of Cape Breton for presentation at the 75th Anniversary Meeting of the Provincial Society. Although retired from medical work for a few years he is still an active supporter of the Presbyterian Church and frequently in its pulpits.

For thirty years the physician to the Cumberland County Home for the Poor and the Insane, is the record of Dr. Daniel McIntosh, Harvard University, 1871, of Pugwash, N.S. His services were recently commended by the Municipal Council. Several years ago he was made an Honorary Member of the Medical Society of Nova Scotia. He will be seen and heard at the Anniversary Meeting of the Society this fall.

Dr. Ross Millar, until recently of Amherst, N.S., where he enjoyed a very extensive practice, has been appointed Director-General, Department of Soldiers Civil Re-establishment, and has removed to Ottawa. Dr. Millar had a very exceptional experience during the war, having been on many fronts, and the excellence of his work won recognition. He has been actively interested in medical affairs, more particularly those of Nova Scotia, and his Bluenose colleagues sincerely regret his departure, but follow him to Ottawa with all good wishes.

During a visit to Halifax, in which he conferred with the Provincial Government relative to a programme for dealing with feeble-mindedness, Dr. C. Stanley Raymond, of Waverley, Mass., addressed a largely attended public meeting, dealing with the importance of feeble-mindedness as a factor in many social problems. The legislation of 1927, which was introduced subsequent to a report by a Royal Commission, on which Dr. George H. Murphy represented the medical profession, has been supplemented this year by a money grant, sufficient to permit of the commencement of a farm colony which forms a part of the general scheme.

Dr. Clement McLeod, a Dalhousie graduate, who has been practising in the diseases of the eye, etc., in Halifax for some years, has gone to England, where he is to locate permanently. Dr. McLeod was the secretary of the Halifax Medical Society, and was a general favorite with his colleagues. His departure is much regretted.

The Massachusetts-Halifax Health Commission announces that it will cease its operations in Halifax at the end of May. The Commission was organized to expend the balance of a fund which had been raised in Massachusetts for the refurnishing of homes destroyed in the Halifax explosion of 1917, but also included other moneys placed at the disposal of the Commission. The original intention was to provide a demonstration in health work, to be extended over five years, but by modifying the original programme the Commission found it possible to continue operations for a longer period. As in the case of all enterprises of this sort there has been some variety of opinion as to the merits of methods adopted. It is quite certain that while the general death rate and the infant mortality rate of Halifax were both very high for years before the Commission began operations, there has been a steady and very marked improvement in both rates during the time of the Commission's activities. These results results cannot fairly be attributed to the activities of the Commission alone, but should be shared amongst the medical profession, the official health organization, and voluntary health organizations, the Victorian Order of Nurses, *et alia*, as well. It would be unfortunate if an endeavour were not made to apportion the credit for the improvements of the health in Halifax to all such various organizations, and it would also seem desirable that an appraisal of the value of the Commission's work should be made by some competent but unbiased committee. The general feeling in Halifax appears to be that the work of the Commission is to be regarded as extremely valuable, and that arrangements should be made which will provide for the continuation of the work in such modified fashion as may be determined by circumstances.

On recent occasions the Halifax Rotary Club has been favoured by addresses from two eminent medical men who are but occasional, but always welcome, visitors to the Bluenose province; Dr. J. V. Anglin, of Saint John, and Dr. J. H. Elliot of Toronto.

The recent tour of several of the local medical societies in Nova Scotia by Drs. Adamson and McKay, of Winnipeg, who came under the auspices of the Canadian Medical Association, proved very successful. Wherever they went they were heartily received and their various addresses greatly appreciated. It was exceedingly unfortunate that the programme made it impracticable to arrange a meeting at Halifax, but during the few hours that they could be in the city, the endeavour was made to have them meet socially as many of the local men as possible. After the completion of the tour Dr. Adamson took ship for England on a mission connected with the proposed meeting of the British Medical Association in Winnipeg in 1930; while Dr. McKay decided to spend a few days visiting the old haunts and the remaining friends of his native province.

Drs. M. G. Burris, Kinley and N. H. Gosse have been appointed assistant surgeons at the Victoria General Hospital. It is understood that there will be some rearrangement of the administration of the clinical work of the hospital, which has been thought of for some time, and which has become possible since recent appointments have been made to the staff of the hospital.

It is with very profound regret that his colleagues on the medical faculty of Dalhousie learn of the resignation of Dr. Boris P. Babkin from the chair of physiology at the university. During the few years that Dr. Babkin has been in Halifax he has greatly endeared himself to all with whom he has come in contact, while he has strengthened the reputation he had already won as a physiologist of the first rank. It is gratifying to know he is not to be lost to Canada, of which he has become a citizen, but that he is to go to McGill University, where it is understood his time is to be devoted almost entirely to personal research and to directing the work of research students.

The recent death of Judge W. B. Wallace has been much deplored by those associated with the Victoria General Hospital. Judge Wallace has been chairman of the Board of Hospital Commissioners for several years and a member of that board since its inception. He was a man of singular breadth of view and capacity for work, who held in an unusual degree the confidence and esteem of his fellow citizens, and whose interest in all things which tended to bettering conditions among the poorer people was very keen.

S. L. WALKER

XUM

NEW BRUNSWICK

A most interesting piece of legislation has been successfully accomplished by the Province of New Brunswick. In the past the Municipality of Saint John has maintained a tuberculosis hospital through a civic grant and a small aid from the Provincial Government of $0.30 a day, per patient for one hundred days.

The new legislation provides a grant of $1.00 per day per patient to local sanatoria caring for tuberculous patients. This will allow public patients to enter the hospitals at a nominal charge which has been agreed upon between the Provincial Legislature and the Commissions of the tuberculosis hospitals.

With River Glade Sanatorium in the western part of the province and the Saint John County Hospital in the south, it is now evident that such an institution is needed on the north shore, especially as this portion of the province is largely French in population.

An epidemic of measles was threatened in one of the orphanages for infants in the City of Saint John, recently, one of the nurses in charge having been infected with the disease for a couple of days before she reported sick. There were sixty-seven children in the wards of this institution, and the gravest fears were held for their safety. The authorities, under the direction of Dr. William Warwick, District Medical Health Officer, and Dr. R. A. Massie, physician for the institution, obtained several adult patients, convalescing from measles, from whom was obtained sufficient blood to allow Dr. Abramson, Pathologist, to prepare serum sufficient to inoculate the children who were contacts. The protection thus afforded has been 100 per cent successful.

The extra-mural meeting in March was the occasion of a visit to New Brunswick of two gentlemen from the far west, Dr. J. D. Adamson of Winnipeg and Dr. D. L. McKay also of Winnipeg. Dr. Adamson spoke of the results and benefits derived from a careful survey of blood-pressure findings. The Doctor's paper showed evidence of a most painstaking and exhaustive study of the various findings in relation to increased blood-pressure. His presentation was much appreciated, and especially his preliminary remarks relating to the alliance of all parts of Canada in matters medical.

Dr. McKay was welcomed by a number of old classmates, and was quite at home in these provinces from which he originally came.

We hope to see more of both of these gentlemen and others from Winnipeg.

Dr. I. W. N. Baker, Saint John, who has been confined to his home by severe illness is now reported to be slightly improved.

Dr. Felix Dumont, of Petit Rocher, is now in New York doing special study in eye, ear, nose and throat conditions. On his return he will remove to Campbellton, where he will practise his specialty.

Dr. C. M. Kelly, from Saint John, sailed in April for Europe accompanied by his family. Dr. Kelly will spend three or four months in England and on the continent, combining a holiday for his family with a period of study for himself.

Dr. John B. McKenzie, of Logieville, is at present in Great Britain following post-graduate studies.

The first appearance of the Honourable Dr. H. I. Taylor, Minister of Health in the Legislature, was the occasion for the presentation of a bouquet of roses to him on behalf of the members of the Assembly. Dr. Taylor's popularity is not confined to Charlotte County, but is shared in by all his colleagues throughout the province.

Recently Dr. H. B. Hay, of Chipman, N.B., celebrated his sixty-seventh birthday, being born at Woodstock in 1859. He was a graduate of Mount Allison University, Columbia University in 1883, City of New York University 1885. His friends made him a suitable presentation on the occasion of this last birthday.

The Moncton City Council has agreed to guarantee another $25,000 worth of bonds for the Moncton City Hospital.

Dr. Helen MacMurchy, Chief of the Child Welfare Division of the Federal Department of Health, addressed several meetings during her stay in New Brunswick. She attracted large audiences and her addresses received a most satisfactory amount of publicity.

A. S. KIRKLAND

QUEBEC

Before alterations and new buildings are undertaken at the Notre Dame Hospital, Montreal, the board intends to get acquainted with what has been done in the last three years at hospitals of the same type as their own. Two directors, with three members of the medical staff of Notre Dame, have left for Ottawa, to study conditions at the new Civic Hospital, which is of the same type as the Montreal institution.

Three new wings are being built at the St. Vincent de Paul Crêche and are expected to be completed in December next. The work was started last fall, but was suspended during the winter; when completed it will provide accommodation for more than 200 children, bringing the capacity of the institution up to 500.

The urgent need of a larger, more modern, fireproof structure was stressed in the annual report of the president of the Mount Sinai Sanatorium, a constituent society of the Federation of Jewish Philanthropies. The steady accumulation, year by year, of incurable cases has hampered the work of treating incipient cases for which the institution was founded. In order to alleviate the crowded conditions, and minister to as many incipients as possible, porches and servants' quarters have been converted into additional wards, but the limit has been reached. In 1918 there were only 23 patients in Mount Sinai, while at the end of 1927 there were 57. The size of the building has remained stationary. According to a report submitted by Dr. Pattison, of Potts Memorial Hospital, Livingstone, N.Y., after completing his survey of

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REFERENCES

Jordan, Urinary Antiseptics, *Biochem.* J., 5, 274; *Brit. M. J.*, 649, 1913; Wood, Therapeutics, its Principles and Practice; Sollman, A Manual of Pharmacology.

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Phenacetin	2½ gr.
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Mount Sinai, a modern new building should be provided at once, and it should contain a wing for incurable cases and a pavilion for tuberculous children.

A Montreal group working under the direction of Dr. T. Parizeau, has been studying several problems of tuberculosis, and in particular the use of B.C.G. vaccine on young children. Every precaution has been taken in order to avoid possible injury from vaccination, and no harmful effect has been observed in any case. Up to date, 176 babies have been vaccinated and these children will be closely observed, in order to determine the extent of the immunity conferred, if any, and its duration. During a part of the year under review, Prof. A. Pettit of the Pasteur Institute at Paris, has been working with the Montreal group. He brought with him the recommendations of Prof. Calmette on the preparation and use of B.C.G. vaccine. Thus it has been possible to take full advantage of the recent advances which have been made in Europe in tuberculosis research. A number of other investigations are under way by this group.

Careful observations have been taken following the injection of various chemicals into the pleuræ of the lungs of animals. Acidity tests have been made on cerebrospinal fluids. The sulphur content of the blood of patients suffering from tuberculosis in an advanced stage has been determined. It is planned in a continuation of the investigation to carry out an epidemiological study in a given area, by the application of health methods of known efficiency.

The field work includes the municipality of Cap de la Madeleine and now controls the child welfare work of the area. The tuberculosis death rate for the five year period previous to the demonstration was 135 per 100,000 people. The rate during the second year of the demonstration was 50 per 100,000, but has since risen to approximately 92 per 100,000, principally due to lack of provision of sanatorium beds. Thirteen thousand people have been examined at the dispensary since its inception, one-sixth of these coming from the country surrounding the area. Seventy cases in the area, and 58 cases outside, have been diagnosed tuberculosis with positive sputum, and 380 cases in the area and 281 cases outside the area have in addition been positively diagnosed tuberculosis. One hundred and twenty-four cases have been hospitalized. Thirty-nine doctors in the demonstration area and forty-nine outside have been and are referring cases to the dispensary. The families supervised by the nurses to date number 853, with 357 on the list at present.

Agitation is being continued for the removal of an unjust burden on all the general hospitals in Montreal and the citizens who help maintain these hospitals, namely that of compelling them to bear the cost of treatment of certain poor people outside the Montreal district. At the present time, the English and French hospitals of Montreal are compelled by law to send out their ambulances for accident or sickness cases which may be sent in on trains from outlying communities. This is not objected to, it was stated, but the hospitals taking in such cases may have to bear the whole burden of the cost of treatment. The citizens of Montreal have to pay for it. If the hospital taking in such a case can locate the municipality from which the individual came, and successfully push its claim, the municipality must pay one-third of the cost of treatment. The Provincial Government also contributes one-third, and the hospital the remainder. If the hospital is unable to press its claim against the outside municipality, it has to bear the whole cost, as the Provincial Government will only pay when the affected municipality pays its share. This puts a heavy burden on the hospitals of this city, it was pointed out. It is often difficult to make the municipality pay, even if it be known. The suggested remedy, it is claimed, is to make a change in the clause of the act covering such cases. It is desired to change the wording from the municipalities "may pay" to "shall pay." This will make the provincial government responsible for payment by the municipalities of the amount that is due to the hospital. The hospital will present its claim to the government instead of to the municipality in question. There will therefore not be the difficulty of locating the municipality and forcing it to pay. In October of last year the Union of Municipalities of the Province of Quebec passed a resolution at a meeting favouring a change in the act which would be acceptable to the Montreal Hospital Council. Later on a delegation of representatives of Montreal hospitals waited on the provincial secretary, Hon. Athanase David, and he promised to bring the matter to the attention of the Premier, and to give it the fullest attention. The Montreal Hospital Council is now waiting action of the government on this matter.

Since the year 1916, the general death rate has considerably decreased in Montreal; from 19.26 per thousand of population in 1916, it went down to 14.28 per thousand in 1927, which represents a decrease of 25.85 per cent for the period between these two years. The decrease was not a regular one, owing to special circumstances, such as the influenza epidemic in 1918, which caused a great number of deaths; nevertheless it decreased gradually. It is interesting to note that in spite of the typhoid epidemic of 1927, and of the number of deaths from that disease, which amounted to 553 for the whole year, the general mortality rate remained about the same: 14.28 per thousand in 1927 and 14.12 per thousand in 1926. GEORGE HALL

ONTARIO

Dr. G. Harvey Agnew, who has recently resigned from the staff of the Toronto Western Hospital in order to take up an executive position with the Canadian Medical Association, was the guest of honour at a most enjoyable complimentary dinner tendered to him by the staff of the Western Hospital, at the Ontario Club on Monday evening, March 26th.

Dr. F. Arnold Clarkson, Physician-in-Chief to the hospital, acted as Chairman, and among the speakers were Dr. F. C. Trebilcock, Dr. R. W. Wesley, Dr. H. E. Clutterbuck, Dr. T. J. Page, Major A. C. Galbraith and Dr. Victor Graham, all of whom expressed their regret at Dr. Agnew's departure, and paid eloquent testimony to the services he had rendered in the past to the Toronto Western Hospital.

After the speeches a presentation of leather bags and silverware was made to Dr. Agnew.

Dr. Malcolm Kinsella was in charge of the arrangements. About 75 physicians were in attendance.

The second Donald Balfour Lecture, a lecture which commemorates the anniversary of Lister's birthday, was delivered on April 5th in the Convocation Hall of the University of Toronto. The speaker on

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XUM

the occasion was Dr. Charles H. Mayo, of the Mayo clinic in Rochester, Minn.; his subject was "Focal infection in chronic and recurrent diseases."

The final meetings for the session 1927-28 of the Academy of Medicine in Toronto took place during the week of April 15th to April 21st. The various sections elected officers for the next year. Dr. Fred. Marlow and Dr. W. W. Jones were elected as President and Vice-president respectively.

Dr. Malcolm MacEachren, Director of Hospital Activities of the United States and Canada, was the guest of honour at the monthly staff conference held at St. Joseph's Hospital, London, on March 2, 1928. He explained in detail the value of staff and hospital organization. He also inspected the clinical pathological laboratory, the x-ray equipment, and teaching facilities of the Training School for Nurses.

St. Joseph's Hospital is most fortunate in having a Resident Pathologist, Dr. F. W. Luney; Dr. S. M. Fisher is Chief of the Department of Medicine; Dr. A. J. Grant, of Surgery; Dr. P. A. Banghart, of Gynæcology, Dr. Dr. W. P. Tew, of Obstetrics; Dr. E. J. Loughlin, of Anæsthesia; Dr. J. R. Armstrong, of Eye, Ear, Nose and Throat; and Dr. H. E. Schaef, of Radiology. St. Joseph's Hospital is on the list of approved hospitals of the American College of Surgeons.

N. B. GWYN

MANITOBA

At the annual meeting of the Brandon and District Medical Association held on March 19th, Dr. R. P. Cromarty, of Brandon, was elected President and Dr. S. Schultz, of Brandon, Secretary. Dr. Frank McKinnon, of Winnipeg, gave an address on "Abnormal Uterine Hæmorrhage."

The council of the College of Physicians and Surgeons of Manitoba has been altered so that in future it will be composed of eighteen members instead of twenty-five as formerly. The eighteen members will be elected as follows: from the federal electoral districts of Dauphin and Nelson, 1; from Springfield, Provencher and St. Boniface, 1; eight other federal districts as in 1923, one each, 8; Winnipeg South, Centre, and North two each, 6; the Medical Faculty of the University of Manitoba, 2.

Dr. H. W. Lewis, of Angusville, Man., President of the Manitoba Medical Association, has been appointed medical superintendent of the Saskatoon City Hospital and will take over his duties at the hospital about April 10th. Dr. E. W. Whelpley, who has been in practice at Arden, Man., will take over his practice at Angusville.

The appointment of Dr. T. A. Pincock as Deputy Minister of Health for the province is announced in the *Manitoba Gazette*.

Plans for the construction of a $40,000 nurses' home at the Brandon Mental Hospital have been approved at a meeting of the Board of Directors. $20,000 will also be spent to improve the medical wing of the institution.

The biennial meeting of the Canadian Nurses Association will be held in the Fort Garry Hotel, Winnipeg, on July 3-7, 1928.

The following appointments to the Honorary Attending Staff of the Winnipeg General Hospital are announced: Consultant in Rectal Disease, with privilege of beds, Dr. L. N. Pickard; Associate in Gynæcology, Dr. F. L. McKinnon. The appointment of an Associate in Obstetrics will be made shortly.

Hon. Dr. E. W. Montgomery, Minister of Health and Public Welfare, will introduce legislation to safeguard the lives and health of mine-workers in the province.

At the St. Boniface Hospital clinical luncheon, on March 22nd, the following programme was presented: "Hydatidiform Mole," Dr. S. Kobrinsky: "Thallium Acetate in Ringworm," Dr. G. V. Bedford. On April 12th, the programme included: "Induced Labour in Contracted Pelvis," Dr. L. Arthur, "Gastro-pyloro-duodenostomy," Dr. P. H. McNulty, with illustrations by motion pictures.

The amended Form 3, Physician's Notice of Birth, issued by the Provincial Department of Health, now bears the following words: "Were drops put into the eyes to prevent blindness?—If so, what?—The Department of Health strongly urges the use of prophylactic drops. Nitrate of silver drops are provided free through the local health officer."

ROSS MITCHELL

SASKATCHEWAN

The regular monthly meeting of the Regina District Medical Society was held on Wednesday, April 4th, following a dinner at the Kitchener Hotel. A résumé of the work done in the Tuberculosis Clinic at the Regina General Hospital was held, with the presentation of certain picked cases by Dr. Kirby of the Qu'Appelle Sanatorium.

Dr. P. Coodin has moved his office from Sceptre to Leader.

Dr. V. Bourgeault has commenced to practice at Prud'homme. Dr. Bourgeault formerly practiced at Marcelin, Sask. After the outbreak of the war he enlisted for service overseas and after the war was over he practiced in Paris for some time, returning to Canada recently.

Two tours are being arranged under the Extra-mural Post-Graduate scheme, the first of which will take place towards the end of May, and the second in July. All medical men are asked to assist in making these tours a great success.

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ALBERTA

At the annual meeting of the Calgary Medical Society, held on April 2, 1928, the following officers were elected for the 1928-1929 sessions: President, Dr. Walter H. Park; Vice-President, Dr. W. S. Quint; Secretary, Dr. W. H. McGuffin; Treasurer, Dr. G. E. Butterwick; Executive Committee: Drs. R. R. Hughes, M. Cody and A. W. Girvin.

At the same meeting Dr. R. B. Deane gave a delightful address on the "Life and times of Percival Pott."

It is altogether likely that a new hospital will be built in the near future, to take the place of the present Municipal Calgary General Hospital. The question has been under consideration for several months. It was at first thought that with the addition of a new wing at a cost of about $200,000.00 there would be ample accommodation for some years to come. However, with the present rate of growth of the city, and the increasing number of industries, such an addition would soon prove inadequate. It is expected that a thoroughly modern building with sufficient accommodation for many years to come, will be erected at a cost in the neighbourhood of $1,500,000. A special Hospital Accommodation Committee, including Alderman Dr. H. W. McGill (Chairman), Mayor Osborne, Dr. D. Gow and others, has this important question under consideration.

At a meeting held recently in Calgary during Child Welfare week, the Hon. George Hoadley, Provincial Minister of Health, spoke enthusiastically about the travelling clinic which he had organized. He stated that this clinic had operated at 40 points, visited 385 schools and visited 2,346 patients in addition to examining 10,270 school children. Out of 122 centres desiring the services of this clinic 44 had been visited. He remarked that in the near future all districts will be visited. He emphasized the fact that operations can be had at cost price, which is much lower than is made by physicians throughout the province. We have already drawn attention in this *Journal* to this socialistic scheme which has been carried out to the detriment of the physician.

Dr. E. F. Henderson, of Westlock, is reported seriously ill with pneumonia, his confrères look forward, however, to a complete and speedy recovery. Dr. W. B. Honey is acting as locum tenens for the doctor during his illness.

Dr. A. E. Archer, of Lamont, has opened the new addition to the hospital which is filled to capacity. It is apparent that the New Canadians, as the Ukrainians are sometimes called, are appreciating the benefits of hospitalization.

A double investigation has taken place into the construction and management of the Municipal Hospital at Innisfail, with the result that several changes and improvements in the building have been effected. The hospital board has resigned at the request of the Department of Health, and a new superintendent and staff of nurses have been appointed. A new start has been made and we hope matters will be bettered.

Dr. W. A. Lincoln has been called to Montreal owing to the illness of his father, who has undergone a serious operation.

Two post-graduate tours of visiting doctors are planned for Alberta, the first in the latter half of April and the second early in July. It is expected that the medical leaders of Manitoba will be here for the first and eastern pædiatricians for the second. If the clinics are as good as those of last year they will be greatly appreciated. The Canadian Medical Association with the assistance of the Sun Life Assurance Company are doing a great work.

Dr. Falla of Edinburgh, Scotland, has arrived in Alberta to take over the work of Dr. Stuart in one of the outposts, beyond the line of railway at Belvedere. We hope she may have success as she will have some hard driving.

The Alberta Government is planning to appoint an advisory board from the medical profession to help in the work of the Department of Health, which speaks for better co-operation, and should bring good results.

Dr. R. Cohen has moved from Gadsby to Granum, where he has opened an office.

Dr. Robert Elder, formerly of Granby, P.Q., and, more recently of Macleod, Alta., has just returned from several months' post-graduate work in Chicago, in radiology and gastro-enterology. He is contemplating joining Dr. Brayton, to whom he disposed of his practice before going away.

On March 6th the members of the Calgary Medical Society listened to a delightful address by the Reverend Father McDonald on "My little contribution to the memory of Osler."

Dr. M. R. Bow, Deputy Minister of Health and Dr. E. H. Cook, Superintendent of the Provincial Mental Hospital, Ponoka, spoke to the members of the Calgary Medical Society, March 12th, on the proposed Sexual Sterilization Bill which has been passed by the Legislature.

We regret to report the serious illness of Dr. Neil McPhatter of Calgary, who has been in practice for forty-seven years. He came to Calgary in 1912.

Dr. E. K. Stuart, formerly of Belvedere, has gone to China.

Dr. H. C. Wallace of Wainwright is now in the east taking post-graduate work. His practice is being looked after by Dr. C. H. McKenzie.

Dr. Hector McKenzie has given up his practice in Milo and has left for the east.

Dr. J. Weisstub, a graduate of Vienna University is now in practice at Warner.

We are glad to welcome Dr. J. S. McEachern back to Calgary, having spent the past six months in California and at the coast on account of a serious illness which began last May. He has returned fully restored to health.

Dr. E. L. Connor, of Lethbridge, who has been in Montreal for some time for operative care, has returned home greatly improved in health.

There is an opening in each of the following places for a physician, according to Mr. W. G. Hunt, Associate Secretary of the Alberta Medical Association, *viz.*: Endiang, Byemoor, Cluny, Queenstown, Milo, Busby, Berwyn, Gadsby, New Norway, Alix, Bruderheim,

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Dr. W. S. Quint will leave in June for the continent. He will spend some time at Cambridge University in post-graduate work in radiology. He will attend the International Congress of Radiologists at Stockholm.

The first of this year's extra mural post-graduate courses will be given between April 16th and 27th at the following places in Alberta: Medicine Hat, Lethbridge, Calgary, Drumheller, Red Deer, Stettler, Edmonton and Vegreville. The visiting clinics include Dr. O. Bjornson, Dr. A. P. McKinnon and Dr. J. D. McEachern, each belonging to the staff of Manitoba University.

A second post-graduate course will be given in July by Dr. George R. Pirie and Dr. S. G. Ross of Toronto. Both are well known pædiatricians. Dr. Pirie practised for a number of years in Calgary, before going east.

G. E. LEARMONTH

BRITISH COLUMBIA

On March 13th, Dr. G. F. Strong, of Vancouver, gave an interesting talk before the Fraser Valley Medical Society on "Hypertension," giving some of the later research work being done on this subject, together with latest theories as to the cause.

Clinics were held at the Royal Columbian Hospital, New Westminster, on Tuesday, March 27, at which cases were presented by Dr. C. R. Learn, Dr. G. W. Sinclair and Dr. W. A. Robertson. The subject of an increase in the laboratory fees at the Royal Columbian Hospital was discussed by the members of the Society and a committee was appointed to investigate this and bring in a report at the next meeting

At the February general meeting of the Victoria Medical Society, Dr. F. P. Patterson, of Vancouver, was the guest of the Society, and read a paper on "Compression fractures of the spine." Dr. Patterson showed dissected specimens to illustrate his histories and findings. He and his co-workers in Vancouver have done considerable experimental work, and have added much to the knowledge of these spinal injuries. A vote of thanks was passed to Dr. Patterson for coming from Vancouver and providing such a splendid evening. The Vancouver profession often contributes to the programme of the Victoria Society.

The February clinical meeting of the Victoria Medical Society was held at the Royal Jubilee Hospital. The programme was provided by the consultant-staff of the Hospital. Cases and reports were presented by Drs. Walter Bapty, Thomas McPherson, F. M. Bryant, H. E. Ridewood, Thomas Miller, W. E. M. Mitchell, E. W. Boak and S. G. Kenning. Dr. M. Carr read a brief paper entitled "Radiographic examinations of the urinary tract."

The Victoria Dental Society were the guests of the Victoria Medical Society at the regular March meeting. Dr. Emery Jones, of New Westminster, presented a paper on "Oral Focal Infections." The meeting was largely attended, and a lively discussion followed, led by Drs. T. Miller, H. E. Ridewood, J. Harper, R. L. Miller and J. F. Grant. A vote of thanks was passed to Dr. Jones for his most interesting paper.

The March Clinical meeting was held in St. Joseph's Hospital. The consultant staff provided the programme. Cases and reports were presented by Drs. G. C. Kenning, W. E. Scott-Moncrieff, W. E. M. Mitchell, Thomas McPherson, F. M. Bryant, J. H. Moore, H. R. Nelson and Alan Fraser.

The April meeting was held in the Library Rooms. Dr. Tate-Mason, of the Virginia Mason Hospital clinic, Seattle, Washington, was the guest of the Society, and addressed a largely attended meeting on "Surgical Results in Peptic Ulcer," his remarks being illustrated with many excellent lantern slides. A general discussion followed and Dr. Tate-Mason was accorded a hearty vote of thanks for an excellent evening.

Dr. W. H. McIntyre, of Victoria, has left for Port Alice, B.C., to relieve Dr. G. A. Lawson for three or four weeks.

Dr. T. C. Holmes, of Vancouver, is leaving shortly to practice in Lillooet.

Dr. F. W. Andrews, of Summerland, left Vancouver on March 23rd, to spend a few months in California, recuperating after his recent illness.

Dr. G. C. Paine of Telkwa is leaving for Anyox, to assist Drs. D. R. Learoyd and J. W. Lang.

We are very pleased to state that Dr. H. M. Cunigham, who has been ill for some months, is now convalescent and is resuming practice in the Birks Building, Vancouver.

Dr. F. Epplen of Seattle, formerly of Spokane, was a visitor in Vancouver at the beginning of April, and addressed the members of the Vancouver Medical Association at their meeting on April 3rd, when he gave a paper on "Some Newer Methods of Renal Diagnosis."

Plans for the 1928 Summer School of the Vancouver Medical Association are nearing completion. Dr. Joseph Colt Bloodgood, of Baltimore, and Dr. John Phillips, of Cleveland, will be the speakers from the United States. Dr. Andrew Hunter, of Toronto, and Drs. Fred. H. Mackay, C. A. Peters and F. A. C. Scrimger, of Montreal will be the other lecturers. The four last-named will go to Vancouver under the Canadian Medical Association's scheme for post-graduate medical education, made possible through the generosity of the Sun Life Assurance Company.

Dr. F. M. Auld (McGill, 1909), who is a medical missionary in China, has been in Vancouver for some months. He addressed the April clinical meeting of the Vancouver Medical Association.

On June 11th and 12th the Annual Meeting of the British Columbia Medical Association will be held in Victoria, and in connection with this there will be extra-mural post-graduate lectures and clinics by Drs. F. H. Mackay, C. A. Peters and F. A. C. Scrimger, of Montreal, and Dr. Andrew Hunter, of Toronto. At the business meeting of the Association there will be many matters of importance dealt with, and it is felt that as many members as possible should be present. Visiting doctors may be assured of a hearty welcome from the Victoria Medical Association, the members of which will spare no effort to provide an interesting and instructive programme, and do everything possible for the entertain-

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ment of their visitors. One need only look back upon past experiences in Victoria to know what this means.

In July two well-known pædiatricians, Dr. H. B. Cushing of Montreal and Dr. A. W. Canfield, of Toronto, will be visiting the province, and advantage has been taken of this to arrange for post-graduate meetings to be held as under:

Victoria, Tuesday, July 3rd.
Nanaimo, Wednesday, July 4th.
New Westminster, Thursday, July 5th.
Chilliwack, Friday, July 6th.
Vancouver, Saturday, July 7th.

On Monday, May 7th, the Annual Meeting of the No. 6 District Medical Society (branch of the British Columbia Medical Association), will be held in Nanaimo. The speakers will be Dr. G. T. Strong, of Vancouver, on "Heart" and "Blood Pressure," and Dr. Lyon H. Appleby on "Intestinal Obstructions" and "Strangulated Hernia."

It is gratifying to learn that there will be another extra-mural post-graduate tour throughout the province in the latter part of August and early September. The visiting speakers will be Dr. A. T. Bazin, of Montreal, Dr. A. H. Gordon, of Montreal, and Dr. Gordon Bates, of Toronto. They will be accompanied by one local doctor.

Dr. J. H. Blair, late of Fernie, is now practising at Michel, B.C., with Dr. G. F. Young.

Dr. D. P. Hanington has relinquished practice at Kimberley, and has gone east for post-graduate work. The contract practice at that place has been taken over by Dr. D. W. Davis, of Kimberley (Dr. Hanington's late partner), and Dr. J. F. Haszard of Trail.

The Executive-Secretary of the British Columbia Medical Association made a complete tour of Vancouver Island in March, where he found conditions, so far as medical practice is concerned, very favourable. There is considerable activity in the lumber and logging industries around Alberni and Port Alberni, which has brought quite a number of people into that district.

In April, the Executive-Secretary made his annual trip up the coast as far as Stewart. He had interviews with all the doctors at the following places: Powell River, Alert Bay, Bella Bella, Ocean Falls, Prince Rupert, Port Simpson, Anyox, Kincolith and Stewart. The British Columbia Medical Association has 100 per cent membership at these places. Many matters of an economic nature were discussed. J. EWART CAMPBELL

UNITED STATES

The American College of Physicians held its Annual Meeting on March 5-9, 1928, in New Orleans, Louisiana. About one thousand members were present.

The guest of honour for the occasion was Dr. Julius Bauer, of Vienna, Austria, one of the greatest living authorities on internal secretions. He presented an address, and gave several papers and clinics at the Charity Hospital.

The College has undergone considerable reorganization, and, with the advent of many of the best Professors of Internal Medicine to the College, the prospects for the future look very bright.

The following is the new list of officers:—

President.—Charles F. Martin, McGill University, Montreal, Canada.

First Vice-President.—Alfred Scott Warthin, University of Michigan, Ann Arbor, Mich.

Second Vice-President.—S. Marx White, Minneapolis, Minn.

Third Vice-President.—W. McKim Marriott, St. Louis, Missouri.

President-elect.—John H. Musser, New Orleans, Louisiana.

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Effect of Anæsthetics on Hepatic Function.—Sanford M. Rosenthal and Wesley Bourne, Montreal, have undertaken to study the effect of various anæsthetics on the liver, as indicated by bile pigment disturbances and by the bromsulphalein test for hepatic function. They found that brief periods of chloroform anæsthesia are sufficient to produce immediate and delayed toxic effects on the liver; half an hour of chloroform causes injury that requires eight days for functional recovery, while two hours of anæsthesia requires six weeks to return to normal. Disturbance of function could be demonstrated with the bromsulphalein test long after pigment metabolism had returned to normal. Ether produces a definite but transitory impairment of function. Recovery is usually complete in twenty-four hours. Nitrous oxide and ethylene administered through a mask did not produce any change in the bromsulphalein test for hepatic function or any disturbance of pigment metabolism. Nitrous oxide and ethylene given in a closed chamber with poor oxygenation caused both immediate and delayed toxic effects on the liver. Cyanosis in itself increases the toxicity of anæsthetics on the liver. Ethylene would seem to be the anæsthetic of choice for operation in severe liver disease.—*J. Am. M. Ass.*, Feb. 4, 1928.

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Book Reviews

Bedside Diagnosis by American Authors. Edited by George Blumer, M.D., David P. Smith Clinical Professor of Medicine, Yale University School of Medicine; Attending Physician to the New Haven Hospital. Large 8vo; three volumes pp. 898,854, 1068, with 890 illustrations, and index volume of 143 pages. Price $33.00 per set. London and Philadelphia, W. B. Saunders Company, and McAinsh & Co., Limited, Toronto, 1928.

The editor has planned this system as a work on diagnosis which would reflect to-day's advances in every phase. A very successful endeavour has been made to include every medical disease with which the general practitioner, surgeon or specialist may meet. It is based principally upon observation, history taking, personal and familial, careful physical examination and in some instances the application of laboratory methods. Laboratory technique is not described but the proper interpretation of laboratory findings is fully discussed. The physician is urged to base his opinion principally on the physical findings with the laboratory findings as an additional aid. These are essential in certain conditions, in others of secondary importance. Treatment finds no place in the work. It deals purely with diagnosis as the basis of beneficial therapy.

With such a force of collaborators the editor has had no easy task in keeping the work well balanced. His personal touch is evident in the footnotes found throughout. In order to include the clinical picture of all rare and unusual diseases, especially those in which the endocrine glands are concerned, the developmental diseases such as infantilism, mongolism, achondroplasia, or unusual diseases of the nervous system, and yet keep the volume within reasonable compass, it would seem that some of the more important and more frequent diseases have suffered in the space allotted them. For example pulmonary tuberculosis is discussed in 20 pages while asiatic cholera is given 21 pages and disease of the endocrine glands is spread to 344 pages. Congenital heart disease is discussed in 160 pages. This is a most excellent article and well illustrated, yet it seems out of proportion. One is inclined to make the same comment upon 80 pages devoted to the instruments of precision used in study of heart disease. And one wonders whether the 225-page article, most valuable in itself, on the anatomy and physiology of the nervous system should find its place here.

The difficulties of an editor having so many contributors dealing with various subjects is illustrated in two articles dealing with the mycoses. One writing on general infections in the group refers to streptothricosis as a disease caused by infection with species of the streptothrix group, while another who deals with pulmonary mycoses calls the infection streptothromycosis and refers to streptothrix as a term used in an old classification now discarded.

We would particularly point out the entire lack of reference to physical signs in the diagnosis of mediastinal tumours, and no reference to physical examination other than radiological, symptoms being the entire guide. The important subject of mediastinal and tracheobronchial gland tuberculosis is discussed in a few lines with no discussion of the physical examination.

These remarks are made in the spirit of constructive criticism. We have read most of the work carefully and wish to express our admiration of the result of the editor's effort to produce a satisfactory work on diagnosis in which bedside observation is made of prime importance. Physician, surgeon or specialist will find it a valuable work of reference and a constant guide in difficult or unusual cases where the ordinary medical text-book offers little or no help. The wealth of illustration adds much to the value of the work. This is particularly noticeable in the sections dealing with endocrine disturbances and developmental defects. The article on congenital heart disease already mentioned, written by Dr. Maude Abbott, is profusely illustrated. Each volume has its index and there is a convenient desk index covering all three volumes.

J. H. ELLIOTT

Physical Diagnosis. W. H. Rose, M.D., Associate Professor of Medicine in the University of Arkansas. 819 pages, 310 illustrations. Fifth edition, Price $11.00. Mosby Company, St. Louis, 1927.

Dr. Rose has incorporated in this volume the principles of physical diagnosis both for the busy practitioner and the medical student. Anatomy and pathology have been considered as they influence the manifestations of thoracic and abdominal disease. The physical findings in the commoner circulatory and respiratory diseases, together with diagnostic signs pertaining to the head, neck, limbs and thoracic and abdominal viscera are thoroughly treated.

Illustrations are freely used and are the outstanding feature of the book, thus approaching the personal contact of a teaching clinic. Part I deals with the fundamentals in the examination of the respiratory and circulatory systems and the diseases of each. Numerous illustrations accurately delineate the landmarks and there are some excellent photographs of pathological chest conditions. The circulatory system is covered by 250 pages with reference to the anatomy, the valves, pericardium, etc. The polygraph and electrocardiograph as a means of diagnosis of disturbed mechanism receive proper attention. Pathological conditions and physical findings are dovetailed in a very interesting and instructive way.

Part II refers to the abdomen, and the manner in which the method of examination is described is very readable, especially in conjunction with the illustrations. Part III embodies the head, neck and extremities, beginning with the landmarks. Some common diseases of the hair and skin are well illustrated and described, such as alopæcia areata and syphilitica. The illustrations of acromegaly and myxœdema are copies from elsewhere. Actual photographs from the author's cases would have been more instructive. Part IV, on the examination of the nervous system, is concise and compares well with this section in similar text-books.

On the whole the book is easily read and covers well the field of physical diagnosis. It can be recommended to students and practitioners.

C. R. BOURNE

Neoplastic Diseases. James Ewing, A.M., M.D., Sc.D., Professor of Pathology at Cornell University Medical College, New York City; Pathologist to the Memorial Hospital. Third Edition. 1127 pages, 546 illustrations. Price, $14.00. London and Philadelphia, W. B. Saunders Co., 1928. Toronto, McAinsh & Co.

This well-known work has reached its third edition in nine years. This fact, of itself, is sufficient to stamp its value. The general purpose of the book may be gathered from a sentence taken from the original preface. The author "has endeavoured to analyze the numerous etiologic factors which meet in such diverse

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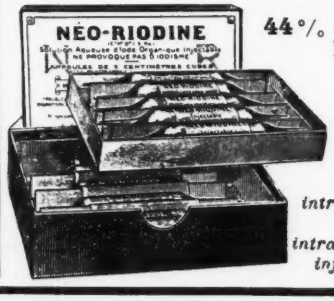

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fashions in the inception of tumours, to emphasize the general dependence of clinical course upon histologic structure, to trace the histogenesis to the last degree, impressing its essential importance when known, and to enumerate and contrast the more striking clinical features which are often highly characteristic of different tumours.'' This purpose has been adhered to consistently in this latest edition, but rather extensive changes and additions have been required to bring the book abreast of present-day knowledge. The chapter on Tumours of Bones has been entirely rewritten, on the basis of information obtained largely from the Codman Registry of Bone Sarcoma, and several new subvarieties of these tumours have been formally recognized. The classification of Mammary Cancer has been simplified and brought more into accord with clinical varieties. The subject of Brain Tumours has been recast, bringing it more into line with the recent work in this field. Some sixty new illustrations have been added.

The first part of the book, dealing with General Oncology, leaves little to be desired in regard to the subject-matter of the various sections, and the way it is handled. The chapters on the theories of tumour-formation, the special etiology of neoplasia, inheritance of cancer, and experimental cancer-research are judicial and illuminating. We wish we could praise as highly the second part, on Special Oncology.

All systematic writers on tumours are quickly brought face to face with the knotty subject of classification. As Professor Ewing states, there are three obvious and useful ways of handling it—the etiological, the regional, and the histological. Each of these has its merits, but none is beyond destructive criticism. Professor Ewing declares his preference for the last. He gives in outline the embryological classification of the late Professor Adami, which he regards as most successful, and accepts his suggested nomenclature as a legitimate one based on accredited data. At the same time, he does not adopt it for reasons which he gives. Chief among them is the objection that strictly embryological classifications do not meet the largest need of the student of tumours. Professor Ewing declares his preference for the generally accepted plan of classification and terminology which is based on histology, modified as much as possible by histogenesis. The arrangement of the subject-matter of the second section on Special Oncology, strikes one as chaotic. It is based partly on histology and partly on regional incidence. Chapters XXII, XXIII, and XXIV deal with tumours of the brain, nerve-trunks, spinal cord, and membranes. Then twenty-two chapters intervene before tumours of the hypophysis and pineal gland are considered. Again, chorioepithelioma and ovarian teratoma would surely be more logically and usefully dealt with in connection with the general subject of teratology than in their regional aspects. It is the opinion of the present reviewer that Professor Ewing's brave attempt to follow a classification based on two fundamentally different principles is no more successful than most of the others. However, as his book is highly specialized, and of most use to the trained pathologist and advanced worker, it may be that these strictures are of little importance. Each one can work out the classification that suits him best. What matters more is what a recognized authority like Professor Ewing thinks about the accumulated data and moot points in connection with neoplasia.

After considering the various theories in regard to tumour formation the author inclines to the opinion that neoplastic growth is due not to the assumption of abnormal powers of growth on the part of the specific cells, but rather to the loss of cell restraints. The facts of tumour growth seem to demand the assumption of a constitutional predisposition. While admitting the value of Slye's work on the influence of heredity on tumour production, Professor Ewing holds that it is still necessary to go out into the field of human tumours and determine by observation how far any hereditary influence proves effective in the causation of tumours. He thinks, further, that clinical and statistical studies do not support the view that heredity plays an important part in the incidence of the main human tumours. Professor Ewing, like most pathologists, discards the parasitic theory, and concludes that Gye's work was imperfectly controlled, and that his theory is at present without substantial basis.

The new nomenclature in connection with brain tumours, introduced by Bailey and Cushing, while helpful, is by no means final, and, accordingly, has been adopted by the author only in part.

The book is provided with an excellent bibliography, which includes all the important articles, and there is an adequate index. A. G. NICHOLLS

Materia Medica and Therapeutics for Nurses. John A. Foote, M.D. New fourth edition. 384 pages, 36 illustrations. Price $3.00. J. B. Lippincott Co., 201 Unity Bldg., Montreal, 1928.

Some of the points to be noted in connection with this edition are as follows:—

A good review of arithmetic is given as a foundation for the study of solutions: there is a lengthy ''Consideration of Drugs and Solutions'' which occupies nearly one-half of the entire text: the articles commonly requiring disinfection are alphabetically tabulated, and the best methods of dealing with each are given. Numerous sets of questions for review are given throughout the book. A portion devoted to ''Poisons and Antidotes'' occupies twenty-four pages; the symptoms and treatments are clear and concise but there is no condensed table for reference in emergency, such as one expects to find in a book of this kind. There is however a good index at the end of the book. The specific drugs and the numerous modern therapies, such as Organo-therapy, Serum Therapy and Physio-Therapy, are discussed at length and in a most interpretative manner. Helpful suggestions are given as to the choosing of patients for ward-clinics and other means of making this difficult subject both interesting and attractive.

After a close perusal, the value of this book seems to be as a reference rather than a text-book, inasmuch as a careful review of its pages shows that there is considerably more subject matter than is required in a nurses' text-book on materia medica. A fair proportion of its contents, through repetition of ''earlier studies,'' serves as an excellent review.

O. V. LILLY

ACKNOWLEDGMENTS

We have received the following publications:—

International Clinics. Henry W. Cattell, A.M., M.D. Volume I. Thirty-eighth series. 307 pages, illustrated, plates. Philadelphia and London, J. P. Lippincott Co., 1928.

The usual well-balanced collection of papers on diagnosis and treatment in medicine and surgery, with contributions in pathology and medical history.

Medical Clinics of North America, vol. ii, Nos. 4 and 5. These are the Tulane University and Brooklyn numbers.

Surgical Clinics of North America, vol. vii, No. 1. The Lahey Clinic Number.

The Rise and Fall of Disease in Illinois, vol. i, 432 pages. Published by State Department of Public Health, 1927.

Surgical ''Don't's'' and ''Do's''. Second (enlarged) edition, by C. Hamilton Whiteford, M.R.C.S., L.R.C.P. 68 pages. Price 4/-. P. P. Harrison & Sons Ltd., London, 1928.

Compend of Pharmacy by F. E. Stewart, Ph.M., M.D. Tenth edition, revised and enlarged by Heber W. Youngken, Ph.G., Ph.M., Ph.D. 199 pages. Price $2.00. P. Blakiston's Son & Co., Philadelphia, 1928.

Annual Report of the Department of Public Health of the Province of Saskatchewan for the year 1926.